C21.5: 957/4

Vol. 957 Number 4

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

April 26, 1977

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
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PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

April 26, 1977 Volume 957 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Official Seal

The Patent and Trademark Office announces a change in the Official Seal of the Office, pursuant to P.L. 93–596, which changed the name of the Office to the Patent and Trademark Office.

Beginning with Letters Patent issued on March 22, 1977, Trademark Registrations issued on March 8, 1977, and Certificates of Correction issued on March 1, 1977, the seal embossed on the document shows the name "Patent and Trademark Office" in lieu of "Patent Office." The emblem portion of the Official Seal has not been changed.

Date: 4–1–77. RICHARD J. SHAKMAN,
Assistant Commissioner for Administration.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,371,455, G. C. Fox, SWIMMING POOL STRUCTURE, **filed** July 22, 1976, D.C.N.J. (Trenton), Doc. C–76–1421, *Fox Pool Corporation* v. *Blue Wtaer Pools and Construction Co. Inc.* **Same, filed** Nov. 23, 1976, D.C., N.D.N.Y. (Utica), Doc. 76–CV–494, *Fox Pool Corporation* v. *Imperial Pools Inc.*

3,413,171, D. F. Hannon, PROCESS OF MAKING IDENTIFICATION CARDS; **3,417,497,** same, IDENTIFICATION CARD, **filed** June 15, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c1554, *Laminex Inc.* v. *Ronald C. Fritz et al.* Decision, none of the claims have been infringed and patents are invalid, Aug. 13, 1974.

3,417,497. (See 3,413,171.)

3,495,668, P. W. Schumacher, DRILL BIT, **filed** Dec. 1, 1976, D.C., S.D. Tex. (Houston), Doc. CA–76–H–1969, *Reed Tool Company* v. *Hughes Tool Company.* **Same, filed** Dec. 1, 1976, D.C., S.D. Tex. (Houston), Doc. CA–76–H–1968, *Reed Tool Company* v. *Smith International Inc.*

3,575,678, W. F. Barton, REED SWITCH ASSEMBLY, **filed** Aug. 9, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c2034, *Grigsby Barton Inc.* v. *Lincoln, Hodges & Associates Inc.* Pursuant to stipulation between the parties, ordered that this cause be and the same is hereby dismissed, Nov. 4, 1974.

3,599,921, W. J. Cumber, INDEPENDENT SUPPORT CLIPS; **3,993,735,** M. R. Irani, CLEANUP OF WET PROCESS PHOSPRORIC ACID, **filed** Aug. 30, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c2504, *Erico Products Inc.* v. *Minerallac Electric Company.* Cause dismissed without prejudice and without costs, pursuant to stipulation of the parties, Mar. 31, 1976.

3,611,910, J. S. Hughes, CORN POPPER, **filed** Jan. 24, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c204, *Ropat Corporation* v. *Mirron Aluminum Company.* The plaintiff is collaterally estopped and permanently barred from asserting U.S. patent and any claim thereof against the defendants, and that judgment is entered in favor of defendants, Sept. 28, 1976.

3,619,381, G. R. Fitterer, DETERMINING OXYGEN CONTENT OF MATERIALS, **filed** Dec. 6, 1976, D.C., W.D. Pa. (Pittsburgh), Doc. C.A.76–1520, *Fitterer Engineering Assoc. Inc. and Dr. George R. Fitterer* v. *Electro Nite Company.*

3,621,143, C. W. Chambers, CURRENT CONTROLLED VOLTAGE BOOSTER FOR TELEPHONE SYSTEMS; **3,639,696,** same, MULTISTAGE VOLTAGE BOOSTER CIRCUIT FOR TELEPHONE SYSTEMS, **filed** Dec. 27, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c3234, *Lorain Products Corporation* v. *Telephone and Data Products Inc.* Enter stipulation of dismissal as to Loraine Products Corp. and Telephone and Data Products Inc., Jan. 16, 1975.

3,639,690. (See 3,621,143.)

3,646,748, F. A. Lang, TENDONS FOR PRESTRESSED CONCRETE AND PROCESS FOR MAKING SUCH TENDONS, **filed** Dec. 7, 1976, D.C. Del. (Wilmington), Doc. 76–432, *PIC Incorporated* v. *The Prescon Corporation.*

3,651,813, M. D. Bryne, CRYOSURGICAL DELIVERY AND APPLICATION OF LIQUEFIED GAS COOLANT, **filed** Nov. 29, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV–76–3684–MML, *Brymill Corporation* v. *Gilmore Liquid Air Company.*

3,669,499, Semplonius and Kolk, CHAIR, **filed** May 2, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c1414, *Steelcase Inc.* v. *Emeco Industries Inc. and Al Treiber.* Motion of the defendants to dismiss the complaint is granted, and the complaint is dismissed for lack of venue, Mar. 24, 1976.

3,684,084, J. C. Kanzelberger, CONTAINER, **filed** Sept. 20, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c2334, *Contemporary Inc.* v. *Ronald T. Jedlinski, doing business as Roman's Religious Goods and Roman's Art & Goods.* Enter final judgment on consent, Mar. 29, 1976.

3,722,399, J. E. Cole, POPCORN POPPER HAVING AUTOMATIC BUTTERING MEANS; **Re. 27,920,** same, **filed** Mar. 21, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c794, *Scovill Manufacturing Co.* v. *K Mart Enterprises of Illinois Inc.* Pursuant to stipulation between the parties, ordered cause dismissed with prejudice, Jan. 21, 1975.

3,746,608, M. Takahashi, SHAPED ARTICLE OF SYNTHETIC RESIN HAVING MECHANICALLY DISORDERED ORIENTATION, **filed** Dec. 9, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c3554, *Weld-Loc Systems Inc.* v. *B. H. Bunn Company.* Cause dismissed without prejudice and pursuant to stipulation of the parties, Mar. 31, 1975. **Same, filed** Dec. 3, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4461, *Weld-Loc Systems* v. *Interlake Inc.*

3,774,785, A. J. Gasseling, KILN LAYING APPARATUS, **filed** Nov. 19, 1976, D.C. Wash. (Spokane), Doc. C–76–295, *Allen J. Gasseling* v. *Ronald McDonald, Jane Doe McDonald and L & R Building Sales Inc.*

3,775,951, Eichholz and McCambridge, VACUUM CLEANER, **filed** Jan. 9, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c64, *Central Quality Industries Inc.* v. *Shelton Products Inc. et al.* By agreement cause dismissed without prejudice and without costs, May 30, 1974.

3,799,433, Bauer, Cairo and Holkeboer, SPACE THERMOSTAT WITH AUTOMATIC SOLID STATE ANTICIPATOR; **3,948,441,** Perkins, Nurnberg and Goodhouse, TIME VARIABLE THERMOSTAT, **filed** Sept. 8, 1976, D.C., E.D. Mich. (DETROIT), Doc. 76–71848, *Robertshaw Controls Company* v. *Emerson Electric Co.*

3,826,271, Sattler and Phillips, AWNING CONSTRUCTION, **filed** Dec. 2, 1976, D.C., E.D. Tenn. (Chattanooga), Doc. 1–76–294, *Wildwood Products Inc.* v. *A & E Plasik Pak Co. Inc.*

3,948,441. (See 3,799,433.)

3,993,735. (See 3,599,921.)

Re. 27,126, W. P. Gingery, DUAL SPLINED SHAFT ASSEMBLY FOR A CLUTCH, **filed** Jan. 31, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c264, *Super-Drive Products Inc.* v. *Illinois Auto Truck Co. Inc.* Order cause dismissed with leave to reinstate, Feb. 2, 1973. Filed stipulation of dismissal, Mar. 21, 1973.

Re. 27,920. (See 3,722,399.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,316,574, Re. S.N. 773,249, Filed Mar. 1, 1977, Cl. 14/16, ROAD EXPANSION JOINT, Robert Lee Pare, Owner of Record: *The General Tire & Rubber Company, Akron, Ohio,* Attorney or Agent: Frank C. Rote, Jr., et al., Ex. Gp.: 352

3,375,763, Re. S.N. 773,250, Filed Mar. 1, 1977, Cl. 94/18, ELASTOMERIC EXPANSION JOINT, John A. Welch, Owner of Record: *The General Tire & Rubber Company, Akron, Ohio,* Attorney or Agent: Frank C. Rote, Jr., et al., Ex. Gp.: 352

3,428,735, Re. S.N. 776,464, Filed Mar. 10, 1977, Cl. 424/330, METHOD OF TREATING DEPRESSION WITH 5-(3-DIMETHYLAMINOPROPYLIDENE) DIBENZO [a,d][1,4] CYCLOHEPTADIENE OR ITS NON-TOXIC SALTS THEREOF, Edward L. Engelhardt, Owner of Record: *Merck & Co., Inc., Rahway, N.J.,* Attorney or Agent: Harry E. Westlake, Jr., et al., Ex. Gp.: 125

3,828,864, Re. S.N. 773,301, Filed Mar. 1, 1977, Cl. 173/49, PILE DRIVER AND EXTRACTOR, Edwin Haverkamp, et al., Owner of Record: *Assors. to H & M Vibro, Inc., Grandville, Mich.,* Attorney or Agent: Price, Heneveld, Huizenga & Cooper, Ex. Gp.: 355

3,869,380, Re. S.N. 773,304, Filed Mar. 1, 1977, Cl. 210/17, TREATMENT OF WASTEWATER, Wilbur N. Torpey, Owner of Record: *Autotrol Corporation, Milwaukee, Wis.,* Attorney or Agent: Thomas W. Ehrmann, et al., Ex. Gp.: 176

3,870,695, Re. S.N. 775,665, Filed Mar. 8, 1977, Cl. 260/146 R, HEAVY METAL COMPLEXES OF AZO DYESTUFFS CONTAINING A 2-AMINO-3-HYDROXYPYRIDINE AS COUPLING COMPONENT, Gerhard Back, et al., Owner of Record: *Ciba-Geigy AG, Basel, Switzerland,* Attorney or Agent: Karl F. Jorda, et al., Ex. Gp.: 117

3,872,498, Re. S.N. 775,865, Filed Mar. 9, 1977, Cl. 358/21, COLOR INFORMATION TRANSLATING SYSTEMS, Dalton Harold Pritchard, Owner of Record: *RCA Corporation, New York, N.Y.,* Attorney or Agent: Eugene M. Whitacre, et al., Ex. Gp.: 358

3,873,382, Re. S.N. 775,069, Filed Mar. 7, 1977, Cl. 148/171, PROCESS FOR THE PREPARATION OF SEMICONDUCTOR MATERIALS AND DEVICES, Warren O. Groves, et al., Owner of Record: *Monsanto Company, St. Louis, Mo.,* Attorney or Agent: Peter S. Gilster, Ex. Gp.: 111

3,900,937, Re. S.N. 774,851, Filed Mar. 7, 1977, Cl. 29/200, SPOT CLINCH MEANS AND METHOD, Louis C. Schleicher, Owner of Record: *Inventor,* Attorney or Agent: William L. Fisher, Ex. Gp.: 321

3,912,545, Re. S.N. 775,004, Filed Mar. 7, 1977, Cl. 148/1.5, PROCESS AND PRODUCT FOR MAKING A SINGLE SUPPLY N-CHANNEL SILICON GATE DEVICE, William E. Armstrong, Owner of Record: *Motorola, Inc., Chicago, Ill.,* Attorney or Agent: Vincent J. Rauner, Ex. Gp.: 111

3,933,052, Re. S.N. 774,590, Filed Mar. 7, 1977, Cl. 74/18.1, PRESSURE COMPENSATED HERMETICALLY SEALED TRANSMISSION SYSTEM, Carl R. Coles, Owner of Record: *Inventor,* Attorney or Agent: Howard H. Darbo, et al., Ex. Gp.: 345

3,937,811, Re. S.N. 776,935, Filed Mar. 11, 1977, Cl. 424/64, FATTY COMPOSITIONS FOR USE IN COSMETIC MAKEUP COMPOSITIONS AND SAID COSMETIC MAKEUP COMPOSITIONS, Christos Papantoniou, et. al., Owner of Record: *Societe Anonyme Diete: L'Oreal, Paris, France,* Attorney or Agent: John W. Malley, et. al., Ex. Gp.: 125

3,942,224, Re. S.N. 776,449, Filed Mar. 10, 1977, Cl. 24/90 B, BUTTONING MEANS, Peter David Benmax, Owner of Record: *Inventor,* Attorney or Agent: Edwin E. Greigg, Ex. Gp.: 351

3,953,162, Re. S.N. 775,516, Filed Mar. 8, 1977, Cl. 8/39 B, DYEING PROCESS, Colin William Greenhalgh, et al., Owner of Record: *Imperial Chemical Industries Limited, London, England,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 144

3,958,969, Re. S.N. 776,471, Filed Mar. 10, 1977, Cl. 65/30 E, MANUFACTURE OF GLASS, David Gordon Loukes, et al., Owner of Record: *Pilkington Brothers Limited, St. Helens, England,* Attorney or Agent: Peter H. Smolka, et al., Ex. Gp.: 173

3,988,519, Re. S.N. 773,728, Filed Mar. 2, 1977, Cl. 428/15, LAMINATES OF A POLYMERIC FILM AND A NONWOVEN FABRIC, Frederick L. Stoller, Owner of Record: *Phillips Petroleum Company, Bartlesville, Okla.,* Attorney or Agent of Record: Donald J. Quigg, et al., Ex. Gp.: 164

3,997,775, Re. S.N. 776,022, Filed Mar. 9, 1977, Cl. 240/1.3, ELECTRONIC FLASH UNIT HAVING AN ADJUSTABLE MOUNTING MECHANISM AND MOVABLE ELECTRICAL PLUG, Jeffrey R. Stoneham, Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Robert W. Hampton, et al., Ex. Gp.: 211

4,006,780, Re. S.N. 774,375, Filed Mar. 4, 1977, Cl. 169/26, RUPTURING HEAD FOR FIRE EXTINGUISHERS, William J. Zehr, Owner of Record: *The Protectoseal Company, Bensenville, Ill.,* Attorney or Agent: Charles W. Rummler, et al., Ex. Gp.: 313

PATENT NOTICES

Certificates of Correction for the Week of Apr. 26, 1977

Re. 29,009	3,981,417	3,995,521	4,003,750
Re. 29,136	3,982,232	3,995,734	4,003,780
D. 243,009	3,982,341	3,995,906	4,003,811
3,449,620	3,982,670	3,996,425	4,003,816
3,485,261	3,982,683	3,996,457	4,003,903
3,504,488	3,983,506	3,996,682	4,003,969
3,635,875	3,983,523	3,996,718	4,004,069
3,712,453	3,983,555	3,997,218	4,004,188
3,720,862	3,983,573	3,997,477	4,004,241
3,736,176	3,983,937	3,997,496	4,004,257
3,737,501	3,984,019	3,997,715	4,004,388
3,742,729	3,984,582	3,997,882	4,004,719
3,807,522	3,984,867	3,998,101	4,004,730
3,809,362	3,984,889	3,998,106	4,004,740
3,813,079	3,985,646	3,998,320	4,004,809
3,817,108	3,986,028	3,998,338	4,004,901
3,849,553	3,986,389	3,998,505	4,004,932
3,870,195	3,986,769	3,998,550	4,005,166
3,875,246	3,986,866	3,998,711	4,005,205
3,876,504	3,987,121	3,998,722	4,005,316
3,893,643	3,987,209	3,998,725	4,005,602
3,903,505	3,987,711	3,998,889	4,005,630
3,906,917	3,987,768	3,999,090	4,006,097
3,920,098	3,987,793	3,999,118	4,006,767
3,923,740	3,987,892	3,999,134	4,007,053
3,940,691	3,988,127	3,999,170	4,007,107
3,941,115	3,988,452	3,999,245	4,007,318
3,941,421	3,988,470	3,999,463	4,007,413
3,943,865	3,988,541	3,999,819	4,007,837
3,948,381	3,988,753	3,999,945	4,007,894
3,948,750	3,988,920	4,000,082	4,007,908
3,949,229	3,988,936	4,000,111	4,007,979
3,952,716	3,989,042	4,000,175	4,008,056
3,954,956	3,989,997	4,000,262	4,008,085
3,954,994	3,990,853	4,000,528	4,008,332
3,955,918	3,991,413	4,000,987	4,008,368
3,956,255	3,991,480	4,000,998	4,008,434
3,957,823	3,991,824	4,001,243	4,008,499
3,957,898	3,992,458	4,001,265	4,008,695
3,960,954	3,992,676	4,001,535	4,008,792
3,962,176	3,993,357	4,001,673	4,008,823
3,963,825	3,993,399	4,001,909	4,008,933
3,965,904	3,993,669	4,002,289	4,008,934
3,967,885	3,993,721	4,002,425	4,008,981
3,968,269	3,993,806	4,002,433	4,008,989
3,970,912	3,993,922	4,002,451	4,009,271
3,971,023	3,994,428	4,002,512	4,009,302
3,972,174	3,994,462	4,002,749	4,009,441
3,972,779	3,943,599	4,002,815	4,009,600
3,975,167	3,994,647	4,002,972	4,009,910
3,975,221	3,994,708	4,003,041	4,010,012
3,976,429	3,994,737	4,003,044	4,010,479
3,977,568	3,994,967	4,003,362	
3,980,742	3,995,211	4,003,379	
3,981,315	3,995,473	4,003,534	

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 26, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-13-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	6-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	4-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food: Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-5-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-2-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-19-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	9-13-76

Expiration of patents: The patents within the range of numbers indicated below expire during April 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,931,038 to 2,934,765, inclusive
Plant Patents..... Numbers 1,926 to 1,948, inclusive

REISSUES

APRIL 26, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

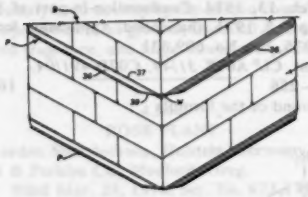
Re. 29,192
SLIP PALLET

Raymond F. Anderson, Arvada; Ronald C. Mackes, Northglenn; Richard Edwin Andrews, Arvada, and Patrick Maurice Mawe, Wheat Ridge, all of Colo., assignors to BQP Industries, Inc., Denver, Colo.

Original No. 3,776,145, dated Dec. 4, 1973, Ser. No. 243,507, Mar. 27, 1972. Application for reissue Apr. 22, 1975, Ser. No. 570,381

Int. Cl.² B65D *19/00*

U.S. Cl. 108—51.3 **8 Claims**



11. A reuseable slip pallet adapted to hold a load of cardboard boxes or the like, and to be carried upon a platen which slides underneath the loaded slip pallet to move the slip pallet onto and off of the platen, the platen including a pull-push means to grip an edge of the pallet and to pull and slide the loaded pallet onto the platen and to push and slide the loaded pallet off of the platen;

said pallet having a central area whereon the box load is placed;

a tab along the side of at least one edge of said central area, partially folded upwardly along the edge of said central area to be gripped and held by the aforesaid gripping means;

said pallet being comparatively thin and flexible and thus being yieldable whereby it is subject to rippling and buckling effects when the platen is sliding under the loaded pallet, but is capable of preventing excessive folding or tearing due to such rippling and buckling effects, said pallet being formed of a tough, pliable sheet of single thickness of polyolefin resin having a thickness in the range of approximately 20 to 125 mils, a tensile strength in the range of 2,500 to 4,500 p.s.i. and a vicat softening point temperature in excess of 250° F.;

with the aforesaid tab fold being a compression-formed crease in at least one surface of the sheet at the boundary between said central area and said tab and constituting a shallow groove which does not impair the strength of the pallet between said central area and said tab; and

a modified upper surface at said central area adapted to increase the static frictional resistance between the box load and the pallet to a degree which exceeds the sliding frictional resistance between the pallet and the platen and wherein the difference in the coefficient of friction between the upper and lower surfaces exceeds 0.15, whereby said pallet will hold the box load without significant slipping between the box load and pallet when the platen is sliding under the pallet.

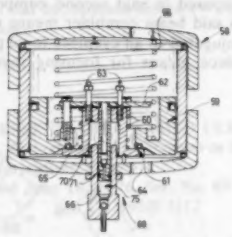
Re. 29,193
FLUID METERING DEVICE

Lance John Carlyle, Cambridge, New Zealand, assignor to Economics Laboratory, Inc., St. Paul, Minn.

Original No. 3,818,924, dated June 25, 1974, Ser. No. 294,984, Oct. 4, 1972. Application for reissue Oct. 6, 1975, Ser. No. 619,951

Int. Cl.² G05D *11/00*

U.S. Cl. 137—99 **19 Claims**



18. A fluid metering device having a housing with a hollow interior and inlet and outlet openings respectively into and out of said hollow interior, first pumping means within said hollow interior and displaceable under fluid pressure between said inlet and outlet openings from an 'inlet' position to an 'outlet' position to pump fluid through said fluid outlet opening, biasing means tending to retain or restore said first pumping means to said 'inlet' position in use, and said first pumping means defining a passage communicating between said fluid inlet and outlet openings; characterized by: closure means adapted to close said passage at said 'inlet' position and also during displacement of said first pumping means, under fluid pressure, from said 'inlet' position to said 'outlet' position and to open said passage at said 'outlet' position and also during movement of said first pumping means from said 'outlet' position to said 'inlet' position; and second pumping means actuated on movement of said first pumping means to meter a predetermined quantity of other fluid into said first mentioned fluid on each cycle of said first pumping means.

Re. 29,194
METHOD AND APPARATUS FOR TRANSFERRING DATA

Walter R. Ambrose, Naples; Robert T. Shone, Pittsford, both of N.Y., and Brian H. Welham, Cincinnati, Ohio, assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Original No. 3,770,347, dated Nov. 6, 1973, Ser. No. 207,818, Dec. 14, 1971. Application for reissue Oct. 30, 1975, Ser. No. 627,411

Int. Cl.² G03B *27/52, 27/70*

U.S. Cl. 355—43 **43 Claims**

1. An instrument for use by a human operator in transferring graphical information from an input record to an output record, comprising:

a. a first compound microscope having a first optical axis and objective and eyepiece means disposed at cooperative optical conjugates along said first optical axis;

b. a second compound microscope having a second optical axis and objective and eyepiece means disposed at cooperative optical conjugates along said second optical axis; said eyepiece means being in common with the eyepiece means of said first compound microscope;

c. semireflective beam combiner means disposed across said first and second optical axes for transmitting and reflecting portions of rays directed along said axes by said first

and second compound microscopes toward said common eyepiece means;

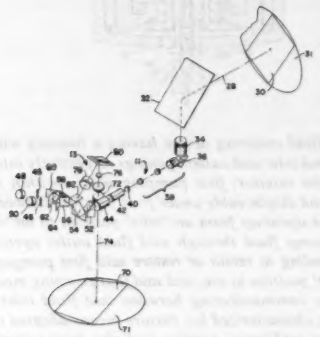
d. means for mounting an input record in an object plane conjugated to said objective of said first compound microscope;

e. means for focusing said first compound microscope on said object plane;

f. output record receiving means including means defining a substantially planar surface adjacent a human operator station;

g. lens means disposed in said first compound microscope between said beam combiner means and said objective, and conjugated to an eyepiece focal plane of said common eyepiece means for focusing rays emanating from said input record to form an image of said input record in said eyepiece focal plane;

h. lens means disposed in said second compound microscope between said beam combiner means and said objective and conjugated to an eyepiece focal plane of said common eyepiece means for focusing rays emanating



from said output record to form an image of said output record in said eyepiece focal plane superimposed over said image of said input record;

i. means for mounting said second compound microscope at a fixed object conjugate above said planar surface;

j. means including means for disposing said common eyepiece means adjacent said human operator station in position to receive at least one of said human operator's eyes in correspondence with an exit pupil of said eyepiece means while simultaneously having said planar surface in position to receive manual transfer of data by said human operator from said input record to said output record; and

k. means in said first compound microscope between said objective and said beam combining means, including at least a variable magnification system which is continuously variable over a range of magnifications without variance of the object conjugate, for modifying an image of said input record to correspond with an image of said output record.

Re. 29,195

3-(3-CHLORO-2-PROPENYL)-1,3,5,7-TETRAAZABICYCLO(3.3.1)NONANE AND ITS PREPARATION

Thomas P. Brady, Natick, Mass., assignor to The Dow Chemical Company, Midland, Mich.

Original No. 3,862,939, dated Jan. 28, 1975, Ser. No. 408,889, Oct. 23, 1973. Application for reissue Dec. 8, 1975, Ser. No. 638,790

Int. Cl.² C07D *251/72*

U.S. Cl. 260—248 NS **4 Claims**

1. A member of the group consisting of [7-] *3*-cis-(3-chloro-2-propenyl)-1,3,5,7-tetraazabicyclo(3.3.1)-nonane -[3-methanol] and [7-] *3*-cis-trans-(3-chloro-2-propenyl)-1,3,5,7-tetraazabicyclo(3.3.1)nonane [-3-methanol] .

Re. 29,196

ALKYLPHENYL BENZOPYRANOPYRIDINES

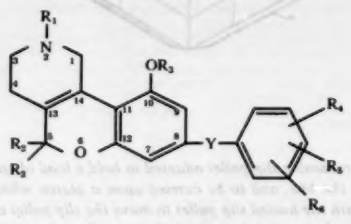
Martin Winn, Deerfield, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Original No. 3,932,432, dated Jan. 13, 1976, Ser. No. 442,032, Feb. 13, 1974. Continuation-in-part of Ser. No. 345,942, April 2, 1973, abandoned. Application for reissue June 25, 1976, Ser. No. 699,831

Int. Cl.² A61K *31/44*; C07D *491/04*

U.S. Cl. 424—256 **16 Claims**

1. A compound of the formula



where R_1 is hydrogen, loweralkyl, 3-methyl-2-butenyl, *propargyl*, 3-chloro-2-propenyl, cyclopropylmethyl, phenylloweralkyl, or 3(3,4,5-trimethoxyphenyl)-2-propenyl; R_2 is methyl; R_3 is hydrogen; [Y is a radical of the formula

where n is a linear chain of 1–9 carbon atoms and R_7 is H or CH_3;]

Y is a straight or branched chain alkylene group having 4 to 7 carbon atoms and having no branch larger than a methyl group; and each R_4 and R_5 and R_6 are the same or different members of the group consisting of hydrogen, halo, trifluoromethyl or loweralkyl; and the pharmaceutically acceptable salts thereof.

16. A pharmaceutical composition in unit dosage form comprising an analgesic effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier or diluent.

PLANT PATENTS

GRANTED APRIL 26, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,043

ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Oct. 16, 1975, Ser. No. 622,844

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—20 **1 Claim**

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its vigorous, upright habit of growth, Cardinal Red flower color, pronounced fragrance, and large downward pointed thorns.

4,044

ROSE PLANT

Reimer Kordes, Sparrieshoop, Holstein, Germany, assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Mar. 29, 1976, Ser. No. 671,171

Int. Cl.² A01H *5/00*

U.S. Cl. Plt.—24 **1 Claim**

1. A new and distinct cultivar of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a bushy, heavily branched plant, high greenhouse production of buds of a clear Buttercup Yellow (W), whose shape is oval but with a blunt or flat tip; Spinach Green (W) glossy foliage and a strong fragrance.

4,045

DIEFFENBACHIA NAMED ULERYII

Dale W. Ulery, Springfield, Ohio, assignor to Ulery Greenhouse Company, Springfield, Ohio

Filed June 18, 1976, Ser. No. 697,329

Int. Cl. A01H *5/12*

U.S. Cl. Plt.—88 **1 Claim**

1. A new and distinct variety of dieffenbachia plant substantially as herein shown and described, characterized by the broad substantially unbroken white central area of its leaves interrupted only by its prominent veins and a very light green midrib, the margin of the leaves being of a solid dark green color which flows irregularly inward of the white central area.

Re. 29,199

4-(3-CHLORO-2-PROPENYL)-1,3,5,7-TETRAAZABICYCLO[3.3.1]NONANE AND ITS PREPARATION

Thomas E. Brady, Ballet, Minn., assignor to The Dow Chemical Company, Midland, Mich.

Original No. 3,931,159, dated Jan. 20, 1976, Ser. No. 468,869, Oct. 23, 1972. Application for reissue Nov. 8, 1976, Ser. No. 739,796

1 Claim

U.S. Cl. 260—239.3 R

ROSE PLANT

William A. Warren, Zanesville, Ohio, assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Oct. 18, 1974, Ser. No. 515,844

1 Claim

U.S. Cl. 47—58

1. A new and distinct cultivar of rose plant substantially as herein shown and described, characterized by its vigorous, upright habit of growth; Cluster Flowered-Climber; prolific blooming habit; and its pink flowers produced singularly and in clusters.

A 646

ROSE PLANT

Robert Kordes, Sparrieshoop, Holstein, Germany, assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Nov. 29, 1976, Ser. No. 745,672

No. Cl. 260

U.S. Cl. 47—58

1 Claim

1. A new and distinct variety of rose plant substantially as herein shown and described.

PATENTS

GRANTED APRIL 26, 1977

ERRATA

For CLASS	See PATENT NO.
280–214	4,019,230
048–055	4,019,274
081–052.4 R	4,019,412
010–013	4,019,432
124–061	4,019,480
192–048.91	4,019,586
227–119	4,019,666
242–131.1	4,019,700
242–152.1	4,019,701
267–160	4,019,750
428–217	4,019,873
428–570	4,019,875
428–621	4,019,876
428–626	4,019,877
075–241	4,019,874
250–396 ML	4,019,989
240–46.59	4,020,047
260–327 P	4,020,168
260–328	4,020,169
260–329 S	4,020,170
260–340.5	4,020,171
260–343.2 R	4,020,172
260–343.6	4,020,173
260–346.8 A	4,020,174
260–347.2	4,020,175
260–349	4,020,176
260–399	4,020,177
428–325	4,020,261
428–276	4,020,262
358–128	4,020,278
258–160	4,020,279
358–242	4,020,280
260–078 UA	4,020,303
235–146	4,020,328
361–227	4,020,393
361–045	4,020,394
361–059	4,020,395
361–064	4,020,396
361–024	4,020,397
361–060	4,020,398
361–331	4,020,399
361–353	4,020,400
361–433	4,020,401

PATENTS

GRANTED APRIL 26, 1977

ERRATA

Re CLASS	Re PATENT NO.
260-214	4,019,230
048-055	4,019,274
081-052.4 R	4,019,412
010-013	4,019,432
124-061	4,019,480
192-048.91	4,019,586
227-119	4,019,666
243-131.1	4,019,700
242-152.1	4,019,701
247-160	4,019,750
428-217	4,019,873
428-570	4,019,875
428-627	4,019,876
428-656	4,019,877
075-241	4,019,874
250-396 ML	4,019,989
240-46.39	4,020,047
280-227 P	4,020,168
280-228	4,020,169
280-229 S	4,020,170
280-340.5	4,020,171
280-343.2 R	4,020,172
280-344.6	4,020,173
280-346.8 A	4,020,174
280-347.2	4,020,175
280-349	4,020,176
280-399	4,020,177
428-252	4,020,361
428-276	4,020,362
358-122	4,020,278
358-160	4,020,279
128-342	4,020,280
280-075 UA	4,020,303
235-146	4,020,728
361-227	4,020,397
361-045	4,023,394
361-029	4,020,395
361-064	4,020,396
361-024	4,020,397
361-060	4,020,398
361-331	4,020,399
361-333	4,020,400
361-433	4,020,401

PATENTS

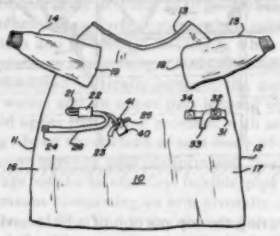
GRANTED APRIL 26, 1977

GENERAL AND MECHANICAL

4,019,207
SURGICAL GOWN BELTING MEANS

John W. Newman, Whitefish Bay, Wis., and Frank D. Schoonover, Douglas, Ariz., assignors to Will Ross, Inc., Milwaukee, Wis.

Filed May 28, 1976, Ser. No. 691,070
Int. Cl.² A41D *13/00*
U.S. Cl. 2—51 6 Claims



1. A belting system for use on a back-closure surgical gown having a front panel and two rear panels integral therewith which comprises:

a first tie having a first end, a second end and an intermediate segment between said first and second ends, said first of said rear panels at about waist level;

a belt transfer means releasably attached to the second end of said first tie;

a belt retention means adapted to be affixed to said gown at or above waist level and proximate to a juncture of the first of said rear panels and said front panel, said retention means releasably retaining the intermediate segment of said first tie at a fixed position with respect to said gown; and

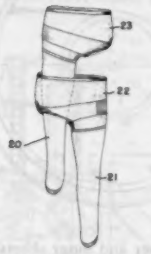
a second tie having a first end, a second end and an intermediate segment between said first and second ends, said first end adapted to be affixed to said gown at or above waist level proximate to a juncture of the second of said rear panels and said front panel, and said intermediate segment adapted to be releasably retained on said gown so as to retain said second end of said second tie at or above waist level.

4,019,208
PANTY STOCKING AND COMBINATION PANTY HOSE GARMENT

Joseph G. Walser, Jr., P.O. Box 49, High Point, N.C. 27261, and John O. Ferrell, Rte. 5, Box 122, High Point, N.C. 27263

Filed Apr. 7, 1975, Ser. No. 565,433
Int. Cl.² A41B *11/00*
U.S. Cl. 2—240 8 Claims

7. A combination pantyhose garment comprising two separate seamless panty stockings, each panty stocking having, toe, foot, leg and panty-welt portions knit of textured yarns, each panty stocking also having an elastic top band, the panty portion of each stocking having a leg opening in said welt portion intermediate the length thereof, a series of courses in said panty portion having elastomeric yarn forming a supporting intermediate band whereby upon placing the panty stocking on the wearer, the panty portions substantially overlap each other and the supporting bands cross over each other,

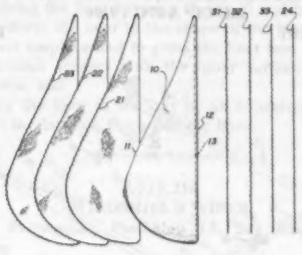


front and back, to provide increased control or support in the panty portion.

4,019,209
ARTIFICIAL BREAST FORM AND METHOD OF FORMING

Wayman R. Spence, Waco, Tex., assignor to Spence Medical Corporation, Waco, Tex.

Filed Apr. 22, 1976, Ser. No. 679,176
Int. Cl.² A61F *1/24;* A41C *3/10*
U.S. Cl. 3—36 12 Claims



1. An artificial breast form comprising:

a. a preformed self-contained stabilized gel structure of breast size and shape, and

b. a porous elastic fabric cover which yields in response to pressures exerted thereon by said gel.

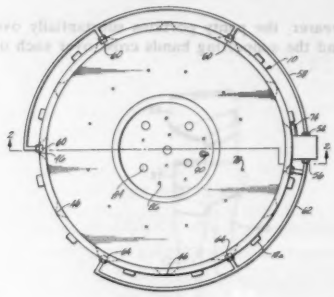
4,019,210
WATER-INFLATED PORTABLE SPA

Richard G. Patterson, Rialto, and Thaddeus W. Fuller, Pomona, both of Calif., assignors to Muskin Corporation, Colton, Calif.

Filed Apr. 12, 1976, Ser. No. 676,303
Int. Cl.² E04H *3/16, 3/18;* F16L *22/02*
U.S. Cl. 4—172 14 Claims

1. A portable pool unit comprising a confining outer wall, a double-wall liner extending around the inside of the outer wall, the liner having an outer sheet of thin flexible material forming the bottom and sides of the pool and an inner sheet of thin flexible material attached and sealed around the margins to the outer sheet to form a confined space between the two sheets, pump means having an inlet and outlet, fluid conduit means coupling the pump means to the pool for recirculating

water in the pool when the pool is filled, and conduit means connecting the outlet from the pump means to the confined



space between the inner and outer sheets to inflate the confined space with water from the pump.

4,019,211

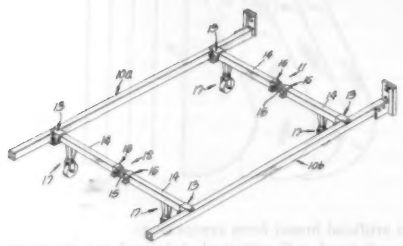
BEDFRAME WITH UNITIZED ADJUSTABLE CROSSBAR

Melvin P. Spitz, 619 N. Elm Drive, Beverly Hills, Calif. 90210

Filed Dec. 16, 1975, Ser. No. 641,254

Int. Cl.² A47C *19/04*

U.S. Cl. 5—181 **10 Claims**



1. A adjustable bedframe crossbar unit assembly adapted to be connected transversely between a pair of bedframe side rails, comprising:

a. a pair of axially aligned sections having adjacent ends in telescoped relation;

b. the innermost of said sections having an outwardly opening longitudinally extending side channel;

c. a plurality of slots extending from the bottom of said channel, said slots being spaced apart longitudinally of the channel;

d. an inverted U-shaped latch member straddling the adjacent end of the outermost of said sections, and being supported for selective guided manual movements between a lowered seated position and a raised position;

e. an inwardly extending projection on the leg portion of said latch member on the side adjacent said channel adapted in said raised position to be disposed in said channel so as to permit longitudinal telescopic adjustment of the sections, and in the lowered seated position to enter one of said slots to retain the sections against relative longitudinal movements.

4,019,212

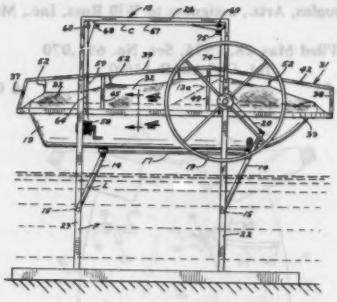
BOAT COVER APPARATUS

Jason K. Downer, Box No. 522, Alexandria, Minn. 56308

Filed Dec. 29, 1975, Ser. No. 644,466

Int. Cl.² B63B *17/02*

U.S. Cl. 9—1.5 **9 Claims**



6. For covering the top portion of a boat having an upper, outer peripheral edge portion that extends generally horizontally around the boat while the boat is supported above the level of the water by boat lift mechanism on a main frame, cover apparatus comprising a collapsible cover of perimetric dimensions substantially greater than the maximum perimetric dimensions of the boat in plan view, a subframe for at least nearly surrounding the boat at an elevation between the boat bottom and the upper, outer peripheral edge portion and vertically movable above the boat out of engagement therewith, means for securing the cover peripheral edge portion to the subframe, means for mounting the subframe on the main frame for vertical movement between an elevation vertically between the level of the water and the boat upper, outer peripheral edge portions, and means mounted on the subframe for resiliently supporting the cover to have the cover abuttingly engage substantially the entire boat upper, outer peripheral edge portion.

4,019,213

PIPING APPARATUS FOR A FLOATING OR SEMI-SUBMERSIBLE PLATFORM

Isaac Behar, Paris, and Maurice Genini, Creteil, both of France, assignors to Coflexip, Rueil-Malmaison, France

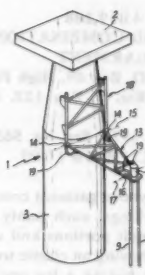
Continuation of Ser. No. 414,197, Nov. 9, 1973, abandoned. This application Sept. 16, 1975, Ser. No. 613,914

Claims priority, application France, Nov. 9, 1972, 72.39657

The portion of the term of this patent subsequent to Oct. 14, 1992, has been disclaimed.

Int. Cl.² B63B *35/02*

U.S. Cl. 9—8 P **3 Claims**



1. Apparatus for the collection of oil from wells in a deep body of water, said apparatus comprising:

a sinker including container means having a volume sufficient to support said sinker at the surface of the water when said container means is full of air and to hold said sinker at the bottom of said body of water when said container means is full of water,

a float of adjustable buoyancy,

first flexible pipe means located between said float and said sinker,

means supported by said sinker for connecting said first flexible pipe means to second flexible pipe means leading to a submarine well, said first flexible pipe means being of a length such as to hold said float only so far beneath the surface of said body of water as to protect said float from the influence of the surface swell when said sinker is on said bottom and to be kept in tension while doing so,

a floating platform comprising a body including oil storage means immersed vertically beneath the surface of said body of water, and an upper part located on top of said body, said upper part being provided with an upper deck emerging above the surface of said body of water, and

conduit means between said platform and float connecting said storage means to said first flexible pipe means, said conduit means comprising an arm pivotally connected at one end to said float and at its other end to said body and additional flexible pipe means extending the length of said arm and connected to said first flexible pipe means.

4,019,214

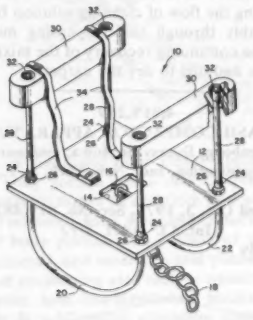
FLOATING PLATFORM

Stewart Shaw, 1000 Pleasant St., Stoughton, Mass. 02072

Filed Jan. 19, 1976, Ser. No. 649,982

Int. Cl.² B63C *9/00*

U.S. Cl. 9—14 **4 Claims**



1. A lifesaving device comprising:

a substantially planar deck adapted to be submerged in a body of water,

a pair of spaced, substantially U-shaped handles secured to the deck and extending downwardly from the bottom surface of said deck,

an upright support connected to the ends of each of said U-shaped handles extending upwardly from the top surfce of said deck,

a pair of buoyant floats secured between adjacent upright supports,

said deck including a centrally located opening,

a spindle transversing said opening, and an anchor chain secured to said spindle.

4,019,215

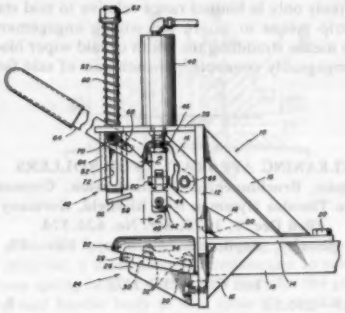
METHOD AND APPARATUS FOR LINING SAFETY BOX TOES

Jules N. Allard, Tyngsboro, and Victor J. Gagnon, Salem, both of Mass., assignors to Bush Universal, Inc., Woburn, Mass.

Filed Apr. 19, 1976, Ser. No. 678,244

Int. Cl.² A43D *7/00*, *65/00*; A43C *13/14*

U.S. Cl. 12—146 D **28 Claims**



1. A method for lining the inner surface of a rigid box toepiece comprising:

providing a mold having a toe end shaped to substantially conform to the inner surface of the box toepiece;

locating a sheet of lining material on the mold to overlie at least the toe end of the mold;

placing the box toepiece over the toe end of the mold and liner;

sandwiching the liner between the mold and box toe piece to conform the liner to the shape of the inner surface of the box toepiece and to press the liner into substantially continuous contact with the inner surface of the box toepiece; and

attaching the liner to the box by an adhesive coating between the box toe piece and the liner.

4,019,216

WINDSHIELD WIPER

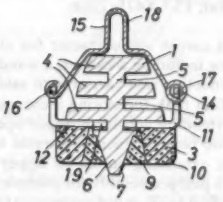
Wolfgang Priesemuth, Postkamp 13, 221 Itzehoe-Nordoe, Germany

Filed Apr. 1, 1974, Ser. No. 456,976

Claims priority, application Germany, Mar. 30, 1973, 2315891

Int. Cl.² B60S *1/46*

U.S. Cl. 15—250.03 **8 Claims**



1. A windshield wiper which includes in combination: spring bow means, a wiper blade having wiping edge means and being on upper flange connected to said spring bow means, a flat wiping body pad extending substantially along the length of said wiper blade and being held against at least one side of said wiping edge means and being movable therewith, said pad being adapted to receive and store a cleaning fluid and to substantially evenly release the same onto the windshield to be

wiped, an elongated stabilizer backing strip having an elongated opening extending therethrough corresponding in length and width to said wiping edge means so that said wiping edge means can pass through said opening to contact the windshield, said stabilizer backing strip means provided with fastening means projecting toward said spring bow means and juxtaposed to face each other on opposite sides of said backing strip means in paired relationship therewith, said pad being connected to said stabilizer backing strip means and being movable freely only in limited range relative to said stabilizer backing strip means to assure flat wiping engagement, and spring clip means straddling the width of said wiper blade and being disengageably connected to each pair of said fastening means.

4,019,217
CLEANING APPARATUS FOR ROLLERS

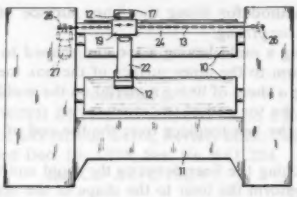
Otto Schinke, Bruchmuehlen-Roedinghausen, Germany, assignor to Theodor Hymmen KG, Bielefeld, Germany

Filed Dec. 1, 1975, Ser. No. 636,574

Claims priority, application Germany, Nov. 29, 1974, 2456401

Int. Cl.² D21G 3/02

U.S. Cl. 15—256.53 **8 Claims**



1. In a machine for application of viscous liquid compositions by means of a plurality of longitudinally extending applicator rollers, the improvement comprising apparatus on said machine for cleaning said rollers, said apparatus comprising a resilient nonrigid cleaning element for each roller, linkage means interconnecting each element to said machine to permit said element to be selectively brought from a storage position to a cleaning position adjacent its roller, and displacement means for moving said elements longitudinally along said rollers.

4,019,218
CARPET SOIL EXTRACTOR

Gilbert G. Cyphert, Glendale, Ariz., assignor to Chemko Industries, Inc., Phoenix, Ariz.

Filed Apr. 15, 1976, Ser. No. 677,264

Int. Cl.² A47L 7/00

U.S. Cl. 15—321 **11 Claims**

1. A self contained carpet soil extractor for cleaning carpets, said soil extractor including a carrier, a wand and a hose assembly for interconnecting said carrier with said wand, said carrier having: (i) a first tank for storing a cleaning solution; (ii) a hinged cover extending across an upper opening of the first tank; (iii) a second tank for receiving waste water; (iv) a hinged sealable cover extending across an upper opening of the second tank; (v) a pump assembly for pumping the cleaning solution from the first tank under pressure; (vi) a vacuum pump assembly for creating a vacuum within the second tank; (vii) a power cord for transmitting electrical power to the pump assembly and the vacuum pump assembly from a source of electrical power; and (viii) wheels for transporting said carrier across a surface, said soil extractor comprising in combination:

a. said wand including a one piece head for supporting:

1. means for dispensing the cleaning solution into the carpet;

2. vertically reciprocable brush means for agitating the pile of the carpet;

3. mouth means for drawing a mixture of the cleaning solution and dirt from the pile of the carpet; and

4. support means for aiding in the transport of said wand across the pile of the carpet;

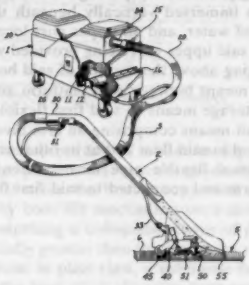
b. said hose assembly including:

1. a first hose for conveying the cleaning solution from the pump assembly to said dispensing means within said wand; and

2. a second hose for interconnecting the second tank with said mouth means within said wand;

c. said carrier including:

1. switch means for energizing the pump assembly to



convey the cleaning solution under pressure from the first tank through said hose assembly to said dispensing means and for energizing the vacuum pump assembly to establish a vacuum within the second tank and draw the mixture of cleaning solution and dirt into said mouth means within said wand, through said second hose and into the waste tank; and

2. hinge means for pivotally securing the waste tank to said carrier and accommodating tipping of the second tank to empty it; and

d. normally closed valve means disposed within said wand for regulating the flow of cleaning solution from said first hose assembly through said dispensing means without affecting the continuing recovery of the mixture of cleaning solution and dirt to dry the carpet.

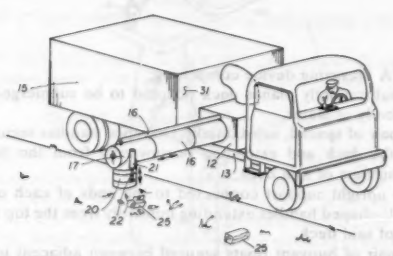
4,019,219
TRASH COMPACTOR APPARATUS

Robert A. Willenborg, Dyersville, Iowa, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 3, 1975, Ser. No. 619,483

Int. Cl.² A47L 5/12

U.S. Cl. 15—339 **1 Claim**



1. Apparatus mountable on the flat bed of a truck for picking up roadside debris, comprising,

a housing for containment of debris,

a suction fan unit externally mounted to said housing with the outlet tube of the suction fan unit led into the housing,

an inlet tube fitted to said suction fan unit which extends, in the mounted position of the unit, in a generally horizontal plane from a lateral side of the suction fan unit,

a pick-up tube fitted to the external end of said inlet tube which extends vertically downwards from said unit in said mounted position,

said inlet tube and said pick-up tube each being formed of telescopic members and each fitted with an individually associated fluid-operated cylinder and piston, the axis of which extends parallel to the axis of the tube to which it is mounted, so that each tube may be independently extended or retracted along its axis by the associated cylinder and piston unit,

said housing fitted with means to compact the debris blown into the housing by the suction fan unit.

4,019,220

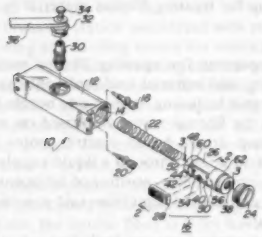
PISTON ASSEMBLY FOR DOOR CLOSER

Sidney Lieberman, Lancaster, Pa., assignor to Reading Door Closer Corporation, Reamstown, Pa.

Filed Jan. 13, 1976, Ser. No. 648,627

Int. Cl.² E05F *3/04*; F16H *1/04*

U.S. Cl. 16—59 **6 Claims**



1. For use in hydraulic door closer apparauts, a piston comprising a body portion and a rack coupled to said body portion transmitting forces to and from said piston, said rack being made of relatively hard, wear and impact-resistant material, and said body portion being made of relatively easily machinable material, and means on said piston for removably supporting and positioning said rack in operative association with said piston, said last-mentioned means comprising a recess portion in said piston extending longitudinally with respect to said piston and having a bottom wall, side wall portions and spaced end walls, the length of said recess portion being slightly greater than the length of said rack so as to constrain said rack from longitudinal movement with respect to the piston, and said side wall portions being spaced apart by a distance slightly greater than the width of said rack so as to constrain said rack from lateral movement with respect to the longitudinal axis of said piston, and means associated with said bottom wall and adapted to engage a rear face of said rack to maintain said rack in spaced relation with respect to said bottom wall and in a desired position with respect to the periphery of said piston, said means associated with said bottom wall comprising a plurality of spaced bosses projecting from said bottom wall into engagement with said rear face of said rack.

4,019,221

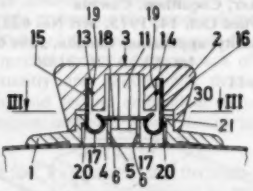
PAN HANDLE

Gerd D. Baumgarten, Wilnsdorf, Wilden, Germany, assignor to Heinrich Baumgarten, Eisen- und Blechwarenfabrik, Neunkirchen, Germany

Filed Mar. 15, 1976, Ser. No. 666,947

Int. Cl.² A47J *36/00*

U.S. Cl. 16—114 A **9 Claims**



1. In a handle for a utensil comprising a handle body of plastics material, a cross-piece for connection to said utensil, at least one spring held in said handle body for the purpose of fastening said handle body to said cross-piece, the improvement comprising wherein said handle body has means defining a groove therein and means defining a shoulder thereon, said spring is a leaf spring accommodated in said groove in said handle body, said leaf spring having a part bent over to form a hook having a curved portion, wherein said cross-piece includes for said leaf spring at least one abutment formed by an edge of said cross-piece, the arrangement being such that in the assembled condition of said handle body said leaf spring bears with the back of said hook thereof against said shoulder formed on said handle body and with a part of said curved portion of said hook against said one abutment edge of said cross-piece.

4,019,222

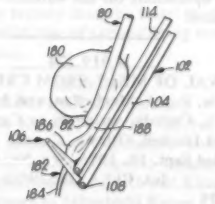
POULTRY EVISCERATING METHOD AND APPARATUS

Donald J. Scheier, Kansas City, and Henry E. Frederick, Parkville, both of Mo., assignors to Gordon Johnson Company, Kansas City, Mo.

Filed Jan. 30, 1976, Ser. No. 653,666

Int. Cl.² A22C *21/00*

U.S. Cl. 17—11 **25 Claims**



1. In an eviscerating machine for automatically removing the digestive tract from a poultry carcass through an opening at the vent of the carcass:

means for holding the carcass against substantial movement and with its opening in a predetermined position;

a pair of separate removal tools each shiftable relative to said holding means through insertion and withdrawal strokes disposed to move the same into the carcass through said opening and subsequently back out of the carcass through the opening.

each of said tools having structure enabling the same to pull on the tract and thereby remove the latter from the carcass as the tools move through their withdrawal strokes; and

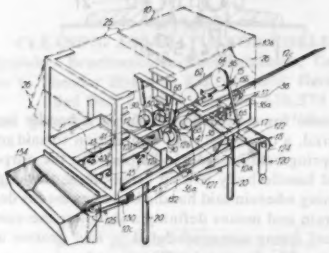
mechanism for positioning said tools at spaced locations along the tract and for moving the tools through their withdrawal strokes at a rate which pulls the tract from the carcass without rupturing the tract at a point between said locations.

4,019,223

APPARATUS FOR CUTTING POULTRY CARCASS

Eric Ralph Lloyd Baker, Coquitlam, Canada, assignor to Elsie Jennie Baker, Coquitlam, Canada

Filed Oct. 14, 1975, Ser. No. 622,168
Claims priority, application Canada, June 6, 1975, 228698
Int. Cl.² A22C *21/00*
U.S. Cl. 17—11 **25 Claims**



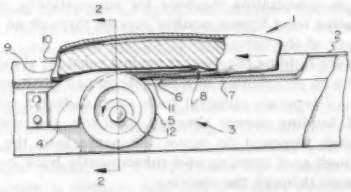
1. Apparatus for cutting poultry carcasses into several pieces comprising frame means carrying support means including a supporting slideway and a guide bar projecting forwardly of said slideway, said slideway having side surfaces which slope downwardly from a central area ridge which forms a continuation of the top of said guide bar, said bar being suitable for insertion through the central cavity of a poultry carcass, said frame means also carrying power driven feeding apparatus arranged to grip a carcass positioned on said bar and to cause movement of the carcass through cutting blade means mounted adjacent said support means, said cutting blade means including first blade means which are positioned below said bar to cut the breast portion of a poultry fed onto said bar with its back-bone uppermost so that the side portions of the carcass are partially separated before said carcass moves onto said slideway, said side surfaces of the support member being arranged to support the side portions of the carcass and being associated with further blade means for performing subsequent cutting operations on the carcass while supported on said side surfaces.

4,019,224

REMOVAL OF MEAT FROM CRUSTACEANS

Pesi Jal Amaria; Roy A. MacLellan, and James W. Tucker, all of St. John's, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Sept. 18, 1975, Ser. No. 614,492
Int. Cl.² A22C *29/02*
U.S. Cl. 17—71 **7 Claims**



1. An apparatus for the removal of meat from a Crustacean member having a tubular shell, comprising:

a. guide means for longitudinally guiding the Crustacean member, said guide means defining an opening;

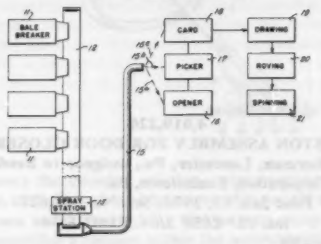
b. a shell slitting device comprising a fixed cutting member and an eccentric rotary cutter disposed in the opening, said fixed cutting member having an elongated guide element disposed substantially parallel to the guide means and operative to be introduced between the meat and shell of the Crustacean member, said eccentric rotary cutter disposed adjacent to the fixed cutting member and operative upon rotation in association with the fixed cutting member to shear the shell longitudinally as the Crustacean member is moved along the guide means into the shell slitting device.

4,019,225

MILL FIBER TREATMENT APPARATUS

James E. Nayfa, 5015 Sharp St., Dallas, Tex. 75247

Division of Ser. No. 327,730, Jan. 29, 1973, Pat. No. 3,894,314. This application June 6, 1975, Ser. No. 584,300
Int. Cl.² D01G *37/00*
U.S. Cl. 19—66 R **8 Claims**



1. Apparatus for treating fibrous material in a textile mill comprising

a conveyor;

powered apparatus for opening fibrous material and for distributing said material uniformly onto said conveyor;

spray apparatus including at least one nozzle for spraying a liquid on the fibrous material carried on said conveyor, and a pump driven by an electric motor for supplying liquid to said nozzle through a liquid supply conduit; said spray apparatus being positioned adjacent to said conveyor, at a location distant from said powered distributing apparatus;

and electric control means including an electric power circuit for said pump motor, and a time delay circuit responsive to the energization and deenergization of said powered distributing apparatus for energizing and deenergizing said power circuit after selected time intervals;

said time delay circuit comprising

a. a delay start controller;

b. a delay stop controller;

c. circuit means for energizing and deenergizing said delay start controller responsive respectively to the energization and deenergization of said distributing apparatus; and

d. circuit means for energizing and deenergizing said delay stop controller through said delay start controller;

said delay start controller being effective, when energized and after a preselected time delay, to close and energize said power circuit and to deenergize said delay stop controller; said delay stop controller being effective, when deenergized, to close said power circuit in parallel with said start controller;

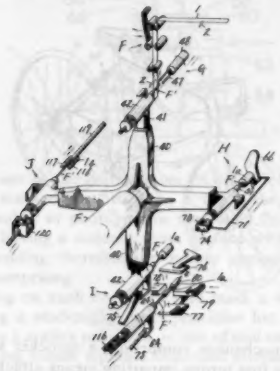
said delay start controller being effective, when deenergized, to open said power circuit and to energize said delay stop controller; and said delay stop controller being effective, when energized and after a preselected time

delay, to open and deenergize said spray apparatus power circuit to deenergize said spray apparatus.

4,019,226
APPARATUS FOR AUTOMATICALLY SHAPING CELLULOSE TYPE MENSTRUAL TAMPONS

Akira Yamauchi, Hyogo; Tetsu Kakuma, Kashiwara; Hisao Yamashita, Kawanishi, and Masahiko Ariga, Takatuski, all of Japan, assignors to Jex Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 302,542, Oct. 31, 1972, abandoned. This application Jan. 15, 1975, Ser. No. 541,128
Claims priority, application Japan, Aug. 10, 1972, 47-80615
Int. Cl.[2] A61L *15/00*
U.S. Cl. 19—144.5 **8 Claims**

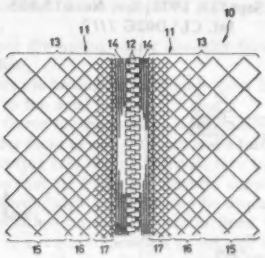


1. Apparatus, as a single unit, for producing menstrual tampons from a long continuous cotton fiber band comprising feeding means for feeding a long continuous cotton fiber band to said apparatus, said fiber band having a plurality of withdrawing strings incorporated therewith at spaced intervals therealong, a breaking station associated with said cotton fiber band withdrawing and feeding means for receiving the continuous cotton fiber band, said breaking station including means for breaking said continuous cotton fiber band into individual cotton fiber articles of a length corresponding to that generally of a finished tampon with each article containing a withdrawing string affixed thereto, a turret spindle mechanism spaced from said breaking station, said spindle mechanism having four spindle elements circumferentially spaced thereabout, means associated with said breaking station for feeding, one at a time, the cotton fiber articles having a withdrawing string affixed thereto produced from the breaking of the continuous cotton fiber band to a spindle element at a fixed point on said turret spindle mechanism, a cotton fiber article winding station mounted on said apparatus in operative relationship with said turret spindle mechanism to form a first station which will be in operating registry with each spindle element, one at a time, said winding station including means to wind the cotton fiber article present on the spindle element in registry therewith, a cotton fiber article withdrawing string embedding station mounted on said apparatus in circumferentially spaced relationship with respect to the cotton fiber article winding station and in operative relationship with said turret spindle mechanism to form a second station which will be in operating registry with each spindle element, one at a time, said string embedding station including means to embed the withdrawing string of the cotton fiber article present on the spindle element in registry therewith and after the cotton fiber article present thereon has first passed through the first winding station, a cotton fiber article compressing station mounted on said apparatus in circumferentially spaced relationship to said string embedding second station and in operative relationship with said turret spindle mechanism to form a third station which will be in operating registry with each spindle element, one at a time, said cotton fiber article compressing station including means to compress the cotton fiber article present on the spindle element in registry therewith and after the cotton fiber article present thereon has first passed through the first winding station and the second embedding station, a cotton fiber article discharge station mounted on apparatus in circumferentially spaced relationship to said article compressing third station and in operative relationship with said turret spindle mechanism to form a fourth station which will be in operating relationship with each spindle element, one at a time, said article discharge station including means to withdraw the cotton fiber article present on the spindle element in registry therewith as a finished tampon, and means for rotating said turret spindle mechanism to advance each of said spindle means intermittently and sequentially through said first winding station, said second embedding station, said third compressing station, and said fourth discharge station.

4,019,227
SLIDE FASTENER STRINGERS

Hiroyuki Ebata, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 25, 1976, Ser. No. 699,691
Claims priority, application Japan, June 30, 1975, 50-81319
Int. Cl.[2] A44G *19/34*
U.S. Cl. 24—205.16 R **5 Claims**



1. A sliding clasp fastener stringer tape supporting a row of scoops thereon, comprising a major region made of a knitted fabric with a net-like texture, said major region being longitudinally divided into a plurality of subregions of progressively finer mesh size from the one lying along one of the longitudinal edges of said major region toward the one lying along the other longitudinal edge thereof, and a relatively narrow scoop-carrying region extending along said other longitudinal edge of said major region, said scoop-carrying region being made of a fabric with a finer texture than the finest mesh subregion of said major region, said row of scoops being mounted on said scoop-carrying region.

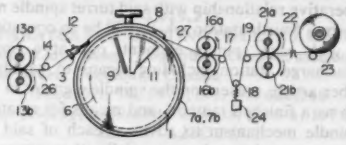
4,019,228
CRIMPING APPARATUS

Goro Ozawa; Kenzo Kosaka, both of Nagoya; Kasumi Sato, Toyohashi; Akio Ishikawa, Toyohashi; Toshiyuki Nanbu, Toyohashi; Kiyoshi Adachi, Nagoya; Tsutomu Okaya, Nagoya; Takashi Goto, Nagoya, and Hiroshi Kitagawa, Nagoya, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Japan

Division of Ser. No. 355,213, April 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 109,885, Jan. 26, 1971, abandoned. This application Sept. 10, 1975, Ser. No. 611,886
Claims priority, application Japan, Mar. 5, 1970, 45-18539
Int. Cl.[2] D02G *1/20, 1/16, 1/12*
U.S. Cl. 28—1.3 **9 Claims**

1. An improved crimping apparatus for crimping one or more filamentary strands of thermoplastic material, comprising in combination, a rotary cylinder having a cylindrical surface, a curved tunnel-shaped stuffing chamber defined by a portion of said cylindrical surface, spaced opposite arcuate stationary side walls disposed normal to the axis of said cylinder and having radially inner arcuate edges adjacent and conforming to said cylindrical surface and a stationary arcuate cover extending between radially outer edges of said side walls

and spaced from said cylindrical surface which constitutes the bottom of said stuffing chamber; an ejection nozzle for said filamentary strands having the ejection end of the nozzle terminating inside said stuffing chamber and directed approximately circumferentially of said cylinder in the direction of



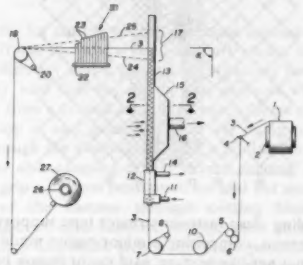
rotation of said cylinder; means for supplying a heated medium into said ejection nozzle; means for supplying said filamentary strand to said ejection nozzle for ejection at a controlled rate into said stuffing chamber by said heated medium; and means for taking up said strands delivered from a downstream outlet of said stuffing chamber.

4,019,229

YARN TEXTURING APPARATUS

Pelham D. Chastang, Bay Minette, Ala., assignor to Monsanto Company, St. Louis, Mo.

Filed Sept. 23, 1975, Ser. No. 615,955
Int. Cl.² D02G 1/12
U.S. Cl. 28—1.6 **1 Claim**



1. Stuffer box yarn texturing apparatus comprising:

a. an aspirating hot fluid jet for heating, tangling, and longitudinally forwarding thermoplastic yarn from a source into and upwardly through an elongated stuffing chamber wherein the yarn is crimped and moves in the form of a plug;

b. means for cooling the yarn as it moves through the chamber;

c. a driven roll for withdrawing the yarn at an abrupt angle from the leading end of the moving yarn plug and pulling the yarn from the chamber; and

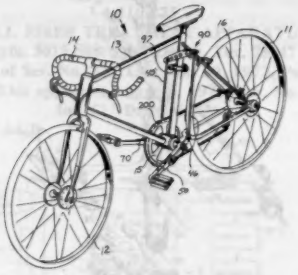
d. a device in the yarn path between said chamber and said driven roll for controlling said abrupt angle at which the yarn is withdrawn from said chamber within the range of 90° ± 30° thereby controlling the distance that the yarn plug moves through the chamber whereby yarn of uniform bulk is provided, said device comprising (i) a base member; (ii) a plurality of closely spaced juxtaposed rod-like yarn guide members having different yarn engaging lengths and being slightly sequentially inclined first in one direction and then in the opposite direction; (iii) one end of each of said guide members being secured in said base; and (iv) the opposite ends of said guide members being bent in the same direction as the guide members are inclined, whereby the tension in the yarn moving in a serpentine path around said guide members is inversely related to the distance that the yarn is from the base member and whereby the crimp pattern of the yarn is rumpled by the yarn being in frictional contact with said guide members, said guide device being further characterized in that when the yarn angle is between 60° and 120° a given number of members are contacted by the yarn and when the yarn angle is less than about 60° or greater than about 120° a greater or lesser number, respectively, of members are contacted by the yarn, whereby the tangle level in the yarn is not significantly changed by changes in the yarn angle between 60° and 120°.

4,019,230

RECIPROCATING POWERED BICYCLE

Melville R. Pollard, 5995 S. Virginia, Reno, Nev. 89502

Filed June 30, 1975, Ser. No. 591,530
Int. Cl.² B62M 1/00
U.S. Cl. 280—214 **1 Claim**



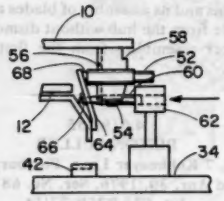
1. A drive mechanism comprising a sprocket suitable to drive a chain; a first torque imparting means attached to one side of said sprocket having the characteristics of imparting torque to said sprocket when rotated in one direction and being free spinning and imparting no torque to said sprocket when rotated in the reverse direction; a second torque imparting means attached to the other side of said sprocket and having the same characteristics of said first torque imparting means so as to impart torque to said sprocket in a like manner and in the same direction; a first hollow shaft attached to said first torque imparting means; a second shaft attached to said second torque imparting means, being concentrically positioned within said first hollow shaft and rotatable therein, the operation of said shafts being independent, a slot means provided in said second shaft; a first force arm adjustably connected to said first hollow shaft and containing insertion means which could be inserted into said slot means on said second shaft; a second force arm adjustably connected to said second shaft, the reciprocal movement of the force arms causing the motion of the said sprocket when said shafts are operating independently of one another; rotary movement of the force arms causing the motion of said sprocket if said first force arm is repositioned on said first hollow shaft so that said insertion means on said first force arm can be inserted into said means in said second shaft so as to lock the shafts together so as to operate in a dependent manner; a rocker arm with a self-centering bearing pivotally mounted on a horizontal stud, which stud is mounted on a vertical frame member; a first connecting link removably connected at one end to said first force arm and at its other end to a first end of said pivotally mounted rocker arm when said shafts are operating independently, being disconnected when said shafts are operating dependently; a second connecting link removably connected at one end to said second force arm and at its other end to a second end of said pivotally mounted rocker arm when said shafts are operating independently, being disconnected when said shafts are operating dependently and a rocker arm limiter is located beneath said rocker arm and is vertically adjustable with respect to said rocker arm, so that the rocking travel of said rocker arm; and the resultant stroke of said force arms is variable according to the vertical clearance between said rocker arm and said rocker arm limiter.

4,019,231

METHOD FOR ATTACHING A SHADOW OR PHOTOGRAPHIC MASK TO A FLANGELESS, CURVED FACEPLATE OF A COLOR TELEVISION PICTURE TUBE

Lawrence W. Dougherty, Sleepy Hollow, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed July 6, 1976, Ser. No. 702,822
Int. Cl.[2] H01J 9/18
U.S. Cl. 29—25.15 5 Claims



1. For use in the manufacture of color television picture tubes, a method for attaching a frameless, non-self-rigid, curved shadow or photographic mask to a flangeless, curved faceplate having a concave inner surface with mask support studs extending therefrom in corner regions thereof, said method comprising:

providing on each corner of said mask a leaf-type spring having a stud-engagement provision for retentively engaging a mating provision on one of said studs, and having indexing means separate from said provision;

supporting said mask in a substantially horizontal position;

supporting said faceplate in a substantially horizontal position and with the concave surface of said faceplate facing a convex surface of said mask;

rotationally and translationally aligning said faceplate and said mask by engaging said studs on said faceplate with a stud aligning means such that said mating provisions on said studs lie in a substantially horizontal, predetermined stud reference plane; and by engaging said indexing means on said springs with a spring aligning means such that said stud engagement provisions lie in a substantially horizontal, predetermined spring reference plane, said spring reference plane being spaced a predetermined distance in a substantially vertical direction from said stud reference plane;

depressing said springs with said spring aligning means;

effecting translational relative motion over said predetermined distance between said faceplate and mask assembly such that said stud reference plane and said spring reference plane coincide; and

releasing said springs such that said stud-engagement provisions on said springs engage said mating provisions on said studs.

4,019,232

RAM TYPE STEEL BAR COUPLING APPARATUS

Seiji Hattori, Nagoya, Japan, assignor to Daido Seiko Kabushiki Kaisha, NagoyaJA

Filed Dec. 3, 1975, Ser. No. 637,178
Claims priority, application Japan, Dec. 4, 1974, 49-139288; May 12, 1975, 50-55657; May 12, 1975, 50-55658
Int. Cl.[2] B21D 39/04; B23P 19/04
U.S. Cl. 29—282 1 Claim

1. An apparatus for coupling two deformed steel bars by one sleeve, said apparatus comprising:

split dies having a bearing portion of smaller inner diameter than the outer diameter of said sleeve,

a substantially U-shaped die frame for supporting said dies,

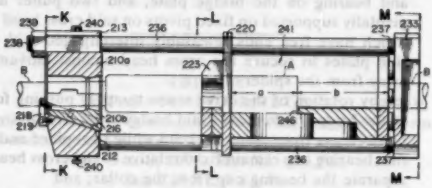
rods connected at one end thereof to said die frame,

a substantially U-shaped bottom frame attached to the other ends of said rods,

a substantially U-shaped intermediate frame supported on said rods between said die frame and said bottom frame so that the intermediate frame can freely slide along said rods and can receive at one side face thereof one end of the sleeve,

a substantially U-shaped hydraulic pressure unit including a plurality of cylinders that can be interposed between said bottom frame and said intermediate frame to slide said intermediate frame along said rods,

said dies comprising upper and lower dies split and separated from each other in a plane passing through the axial line of said dies,



the split faces of said upper and lower split dies having convex and concave portions to be engaged with each other,

said upper die having upper shoulder faces parallel to the axial line,

said lower die having an inclined bottom face slanted at an angle to the axial line,

said die frame having parallel faces confronting said upper shoulder faces to support them and a further inclined face confronting said inclined bottom face to support it, and

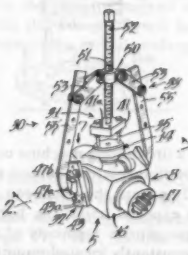
means on said die frame for movably supporting said lower die whereby said lower die can be displaced from a support position on said further inclined face of said die frame to a removed position to one side of said die frame.

4,019,233

PULLER APPARATUS AND METHOD FOR DISASSEMBLING UNIVERSAL JOINTS

James E. Jirele, Owatoona, Minn., assignor to Owatonna Tool Company, Owatonna, Minn.

Filed May 7, 1975, Ser. No. 575,470
Int. Cl.[2] B23P 19/04
U.S. Cl. 29—261 8 Claims



1. A puller apparatus for disassembling a universal joint which has a cruciform spider with opposite arms, first and second bearing cups rotatably surrounding the end portions of a first two opposite arms, third and fourth bearing cups rotatably surrounding the end portions of a second two opposite arms, a first yoke which spans the spider and has first and second collars in which the first an second bearing cups are respectively mounted, a second yoke which spans the spider and has third and fourth collars in which the third and fourth bearing cups are respectively mounted, a bearing cup flange

integral with each bearing cup and overlying the associated yoke collar, and headed bolts which impale holes in each of said flanges and screw into threaded bores in the yoke collars, said puller apparatus comprising, in combination:

a bridge assembly that includes a bridge plate mounted upon studs which loosely impale the holes in the first bearing cup flange when the headed bolts are removed, said studs having distal portions seated in the threaded bores in the first collar;

a pair of side plates which are secured, respectively, to the third and fourth collars;

a puller assembly that includes a cross head having a threaded bore, a drive screw threaded through said bore and bearing on the bridge plate, and two puller arms pivotally supported on fixed pivots on said cross head and which have free ends releasably interengaged with the side plates to secure the cross head against movement away from the spider,

whereby rotation of the drive screw to apply pushing force to the bridge plate moves said bridge plate and first yoke bodily away from the cross head while the spider and the first bearing cup remain fixed relative to the cross head to separate the bearing cup from the collar; and

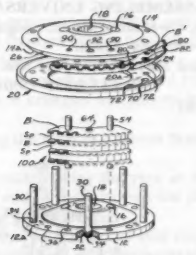
a pair of journal cap which are adapted to surround the end portions of the first two opposite arms of the spider after the first and second bearing cups and the first yoke have been removed, said caps being adapted to be interengaged with the free ends of the puller arms to permit the bridge assembly and the puller means to be used for removing the third and fourth bearing cups and the second yoke from the spider.

4,019,234

TIRE RASP HAVING REVERSIBLE BLADE HOLDER ASSEMBLIES

Wayne E. Jensen, Homewood, and Charles Keith Stanfield, Matteson, both of Ill., assignors to B & J Manufacturing Company, Glenwood, Ill.

Filed May 3, 1976, Ser. No. 682,261
Int. Cl.² B23D *71/00*
U.S. Cl. 29—79 **22 Claims**



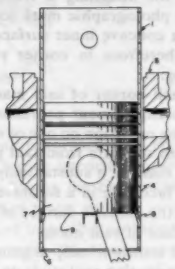
19. Rasp hub for a tire buffing machine comprising a pair of circular-shaped mounting plates adapted to support assemblies of blades and spacers therebetween with the working edge of the blades exposed about the hub periphery which blades and spacers comprise segments of a circle and each have at least three constantly located mounting holes, the hub further comprising separate holder means for each said assemblies of blades and spacers, which separate holder means embody a segment of arcuate extent no greater than that of the blades and spacers assembled thereon, each said segments having a pair of fixed, parallel spaced pin means protruding from opposite sides of the segment on which blades and spacers may be assembled utilizing two of their aligned mounting holes, said segments having a locating hole related to said pairs of pin means which center with the remaining holes of the blades and spacers assembled therewith, one of the hub mounting plates having spaced pairs of openings to receive the pin means protruding from one side of the segment, said mounting plate also having support pins related to each said pairs of openings and which are of a length to pass through the locating holes of the blades and spacers assembled on the segments when said pin means are received in the related pairs of openings, and the other of the hub mounting plates having groups of related openings located to receive the support pins of the first mentioned hub mounting plate and the pin means protruding from the opposite side of the segment as when the two hub mounting plates are closed against the assemblies of blades and spacers on their respective holder means, one of said holder means and its assembly of blades and spacers being readily separable from the hub without dismounting the other blade and spacer assemblies from the first mentioned hub mounting plate.

4,019,235

PISTON PULLER

Leonard Gregg, 7 Kohlmeyer Lane, Pittsburgh, Pa. 15211

Filed Apr. 30, 1976, Ser. No. 681,812
Int. Cl.² B25B *27/14*
U.S. Cl. 29—280 **10 Claims**



1. A tool for removing a piston from a cylinder of a piston driven engine wherein the tool is adapted to be inserted into an annulus defined by the cylinder wall and the piston, said tool comprising:

A. a cylindrical sleeve member having a length greater than the length of the piston to be removed, an outside diameter less than the diameter of the cylinder and an inside diameter greater than the diameter of the piston;

B. means adjacent one end of the sleeve member for inserting the sleeve member into the cylinder; and

C. means adjacent the opposite end of the sleeve member for engaging a wall of the piston to enable it to be withdrawn from the cylinder within the sleeve member.

4,019,236

CRIMPING PRESS CLAMP FOR ELECTRICAL CONNECTORS

Lloyd Carl Osman, Sunbury, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 31, 1975, Ser. No. 645,723
Int. Cl.² H01R *43/04*
U.S. Cl. 29—753 **1 Claim**

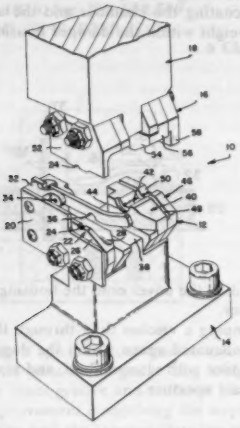
1. A device for removably retaining a connector on an anvil assembly of an operator-actuated crimping press, comprising:

a. a plate adapted to be fastened to the anvil assembly;

b. a housing secured to the plate and having a vertical aperture therein and a slot bisecting the housing and aperture, said slot being in a direction perpendicular to the longitudinal axis of the anvil assembly;

c. an elongated arm having first and second ends and pivotally mounted in slot with the pivot point being inwardly from the first end and with the second end extending across the anvil assembly and t·wards an operator who may be positioned at the crimping press;

d. an indent located on the lower edge of the second end of the arm, said indent being conformable to and in registration with a connector which may be positioned on the anvil assembly; and

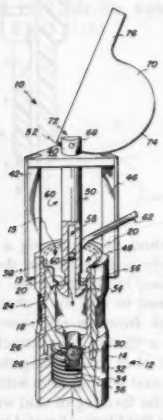


e. biasing means positioned in the vertical aperture and bearing against the first end of the arm and thereby biasing the second end downwardly against a connector which may be positioned on the anvil assembly to retain it thereon, said connector being releasable therefrom by the operator raising the second end of the arm.

4,019,237
TOOL FOR DISASSEMBLING HYDRAULIC VALVE LIFTERS

Alvia K. DeRee, Rte. No. 1, Umatilla, Fla. 32784

Filed Oct. 30, 1975, Ser. No. 627,076
Int. Cl.² B23P *19/04*
U.S. Cl. 29—213 E 15 Claims



1. A tool for disassembling hydraulic valve lifters of the type having a housing enclosing a plunger longitudinally movable through a cylindrical cavity therein, the plunger having a coaxial cavity therein with a circumferential lip or groove adjacent the open end thereof, said tool comprising in combination:

a shaft for communicating into said coaxial cavity of said plunger, said shaft having at the distended end thereof engaging means for engaging said circumferential lip adjacent said open end of said plunger;

activating means coupled to said shaft for activating said engaging means to engage said circumferential lip;

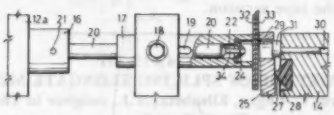
a frame for communicating with said housing for restraining the longitudinal movement thereof, said frame comprising a plurality of legs movably depending longitudinally therefrom with each of said legs being rotatable about a first pivot generally perpendicular to said shaft for movably engaging or disengaging said housing; and

first means movably coupled between said shaft and said frame for longitudinally moving said shaft relative to said frame, whereby said shaft having said plunger coupled thereto by said engaging means is extracted from said cavity within said housing by the movement of said first means.

4,019,238
APPARATUS FOR RIVETING

Ralph Fuhrmeister, Queensland, Australia, assignor to Furma Manufacturing Co. Pty. Ltd., Queensland, Australia

Filed Oct. 8, 1975, Ser. No. 620,764
Int. Cl.² B23P *11/00*
U.S. Cl. 29—243.53 2 Claims



1. Apparatus for riveting sheet material members including:

a frame,

a female die mounted on the frame,

an anvil mounted on the frame,

a rivet carrier having a passage therethrough,

means for conveying a rivet into said passage,

a rivet driver slidable through the passage of the rivet carrier and adaptable to advance the rivet shank-first, relative to the female die, and

a resilient rivet guide within the passage adapted to engage frictionally a rivet advanced by the rivet driver through the passage for maintaining the rivet parallel to its direction of advance,

said rivet driver being adapted to drive the rivet into the female die and towards the anvil thereby penetrating adjacent sheet material members interposed between the rivet carrier and the die, said anvil being adapted to enlarge radially the penetrating end of the rivet shank, and said female die being adapted to permit the withdrawal therefrom of the radially enlarged end of the rivet shank.

4,019,239
METHOD OF PRODUCING MAGNETITE ARTICLE

Georg Heinrich Artur Gerhard Bockstiegel, Hoganas, Sweden, assignor to Hoganas Aktiebolag, Hoganas, Sweden

Filed Sept. 11, 1974, Ser. No. 504,881
Claims priority, application Sweden, Sept. 26, 1973, 7313077
Int. Cl.² H01S *4/00*
U.S. Cl. 29—592 4 Claims

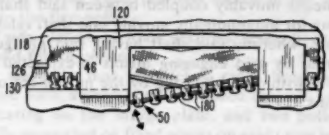
1. A method of manufacturing a magnetite article having a high electrical conductivity, comprising compacting magnetite powder to form a preform, heating said preform at 900° – 1300° C and hot compacting the heated preform at a pressure of 100 to 600 Megapascal in a compacting tool having a temperature below 500° C until a dense magnetite article is produced.

4,019,240

PROCESS FOR GAPPING SLIDE FASTENER CHAIN

Norman W. MacFee, Conneaut Lake, Pa., assignor to Textron, Inc., Providence, R.I.

Filed May 28, 1975, Ser. No. 581,658
Int. Cl.² B21D *53/50*; B29D *5/00*
U.S. Cl. 29—408 **7 Claims**



1. A process of gapping a slide fastener stringer having a continuous row of fastening elements secured to an edge of a tape of the stringer comprising the steps of

gripping a plurality of fastening elements in a portion of the stringer to be gapped,

holding the tape, and

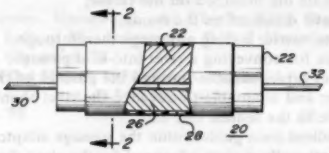
producing relative pivotal movement between the gripped plurality of fastening elements and the held tape so as to separate the gripped plurality of fastening elements from the tape seriatim.

4,019,241

METHOD OF SPLICING ELONGATE MEMBERS

Maurus C. Logan, Elizabeth, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Nov. 10, 1975, Ser. No. 630,747
Int. Cl.² B23Q *17/00*
U.S. Cl. 29—407 **7 Claims**



1. A method of maintaining selective portions of two elongate members in axial alignment with one another comprising the steps of: (a) disposing the ends of said elongate members in end-to-end facing disposition adjacent one another within the axial center of a bundle of at least three elongate cylindrical elements each having a uniform outer diameter; (b) disposing a contractable member about said bundle; (c) radially contracting said contractable member about said bundle so as to cause said cylindrical elements to be displaced inwardly in tangential contacting engagement with said elongate members; (d) transversely dividing one of said cylindrical elements into two parts spaced from one another; and (e) providing an opening in said contractable member coincident with the spacing between said two parts of said cylindrical element, for observing the disposition of said elongate members within said bundle.

4,019,242

VACUUM PRESSURE FILL OF VISCOUS DAMPERS

Donald G. Zook, Metamora; Kenneth J. Miller, and Eugene K. Patton, both of Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

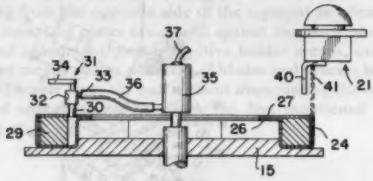
Division of Ser. No. 477,914, June 10, 1974, Pat. No. 3,939,880. This application Oct. 8, 1975, Ser. No. 620,620
Int. Cl.² B23P *19/00*
U.S. Cl. 29—434 **4 Claims**

1. A method of making a viscous damper, comprising the steps of

placing a damper assembly into a vacuum chamber, said damper assembly comprising

a housing, an inertial weight, and a housing cover, with the housing and cover having a single aperture therein, and providing a complete enclosure except for said aperture,

evacuating the chamber and the space around the inertia weight within the damper housing,



welding the cover onto the housing in said evacuated chamber,

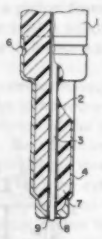
pumping a viscous fluid through the aperture and into the evacuated space within the damper assembly to fill said space with viscous fluid, and sealingly securing a plug in said aperture.

4,019,243

METHOD FOR FORMING A TUBULAR WRITING PEN

Lasse Kuparinen, Hamburg, Germany, assignor to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Division of Ser. No. 535,051, Dec. 20, 1974, Pat. No. 3,977,798. This application Mar. 12, 1976, Ser. No. 666,299
Int. Cl.² B23P *11/02*
U.S. Cl. 29—453 **5 Claims**



1. The method of producing a writing point for a stylographic, or tube writing pen of the type wherein the writing point comprises, in combination, a cylindrical member, traversed from end to end by a channel for the passage therethrough of ink from an ink reservoir at a rear end of the channel, and a writing tube attached to a front end of said cylindrical member, comprising the steps of:

A. forming said writing tube with a front end and a rear end wherein the forming of said writing tube comprises deep-drawing a flat blank of metal in successive stages to define an elongated cup and then cutting off the bottom of said cup to define said front end of said writing tube, and;

B. forming a flat writing surface at said front end, wherein the front end is cold formed to create, at said writing tube end, a hardened writing surface and to define said outlet orifice for ink, and;

C. forming an ink outlet orifice in said flat writing surface, and;

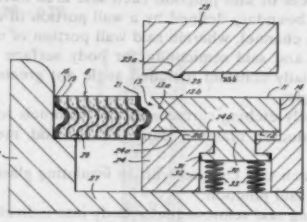
D. securing the thusly formed writing tube in a surrounding relation around said front end of said cylindrical member.

4,019,244

SPIRAL WOUND GASKET ASSEMBLY METHOD

A. B. Owen, and Bruce M. Gifford, both of Houston, Tex., assignors to Lamons Metal Gasket Company

Filed Feb. 17, 1976, Ser. No. 658,509
Int. Cl.² B21D *39/00*; B23P *11/00*
U.S. Cl. 29—520 6 Claims



1. A method of forming a spiral wound gasket assembly having a gasket ring and an ouer metal gauge ring with flat guide surfaces between an inner groove and an outer peripheral edge, wherein the improvement comprising the steps of:

forming a spiral gasket ring with the exterior diameter of the ring allowing positioning of the ring in the gauge ring groove;

positioning the gasket ring within the gauge ring; and

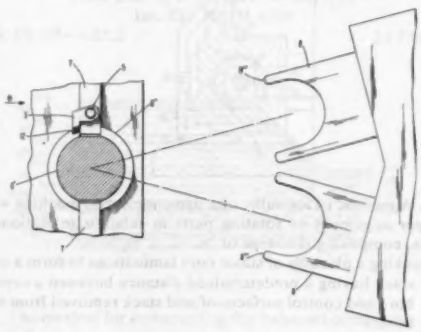
deforming a portion of the gauge ring to reduce the size of the gauge ring groove to tighten and retain the gasket ring within the groove.

4,019,245

DEVICE FOR CLAMPING TOOLS IN THE SEAT OF A TOOL MAGAZINE

Nikola Dimov Stoilov, and Ivan Konstantinov Hoklar, both of Sofia, Bulgaria, assignors to Institute za Metalloobrabotvashti Machini, Sofia, Bulgaria

Division of Ser. No. 542,456, Jan. 20, 1975, abandoned. This application Sept. 25, 1975, Ser. No. 616,774
Int. Cl.² B23Q *3/155*
U.S. Cl. 29—568 1 Claim



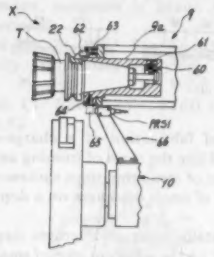
1. A device for clamping tools in the seat of a tool magazine, said seat having at least one key, comprising an axle located in the face portion of the seat of the tool magazine, a cam member pivotally mounted on said face portion adjacent to said axle, the cam being L-shaped and having a front part which is beveled, and a stop projecting from the cam adapted to engage the key of the seat of said tool magazine and a grip adapted to move in a substantially perpendicular direction relative to the axis of said axle and to remove or place a tool in said seat of the tool magazine after said stop has been displaced from said key by said grip, said cam member and axle being so arranged that only the cam's weight applies a rotary torque to the cam to rotate the cam about the axle towards the tool and abut said stop against said key.

4,019,246

MACHINE TOOL WITH AUTOMATIC TOOL CHANGER

Tamaki Tomita, Okazaki, and Manabu Hosokawa, Chiryu, both of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Japan

Filed Oct. 23, 1975, Ser. No. 625,034
Claims priority, application Japan, Oct. 23, 1974, 49-122298
Int. Cl.² B23Q *3/157*
U.S. Cl. 29—568 4 Claims



1. A machine tool comprising:

a tool storage magazine for removably storing a first group of tools and a second group of tools and capable of indexing a selected tool to a predetermined tool change position;

a key way provided upon each of said first and second group of tools;

a plurality of first key members, each of which is slidably disposed upon said tool storage magazine and engageable with one of said key ways of said tools so as to position one of said tools to a predetermined angular position;

a plurality of resilient members, each of which is disposed within said tool storage magazine for urging each of said first key members outwardly to a position for engaging said key ways of said tools;

a spindle head;

a tool spindle rotatably mounted upon said spindle head;

a second key member slidably disposed upon said spindle and engageable with said key way of a first group tool received in said spindle;

a resilient member disposed within said spindle for urging said second key member outwardly to a position for engaging said key way of said first group tool;

a tool spindle indexing device provided within said spindle head for indexing said spindle to a predetermind angular position so as to align said second key member of said spindle with on of said first key members indexed to said tool change position;

a tool change device for exchanging a tool held upon said spindle and a tool positioned at said tool change position on said tool storage magazine;

means for generating a first signal when either the tool to be used next, or the used tool, is a tool of said first group, and a second signal when the tool to be used next, or the used tool, are tools of said second group;

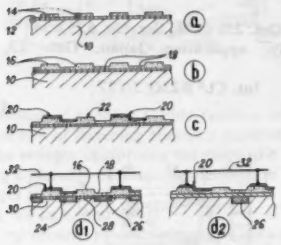
a first control circuit responsive to said first signal for causing said tool spindle indexing device to be actuated and for causing said tool change device to be subsequently operated; and

a second control circuit responsive to said second signal for causing said tool change device to be operated without operating said tool spindle indexing device.

4,019,247
FABRICATION OF A CHARGE-COUPLED DEVICE

Joseph Borel, Echirolles; Jacques Lacour, Grenoble, and Gerard Merckel, Sassenage, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 2, 1975, Ser. No. 538,168
Claims priority, application France, Jan. 4, 1974, 74.00294
Int. Cl.² B01J *17/00*
U.S. Cl. 29—578 **2 Claims**



1. A method of fabrication of a charge-coupled device having one control line the steps of froming an insulating layer of a periodic series of insulating steps successively of substantial thickness and of small thickness on a doped semiconductor substrate,

depositing a metallic layer on alternate steps of substantial thickness and on the adjacent step of small thickness thus forming a series of electrodes separated by a space of two consecutive steps not covered with a metallic layer, one of said consecutive steps being of substantial thickness and the other of said consecutive steps being of small thickness.

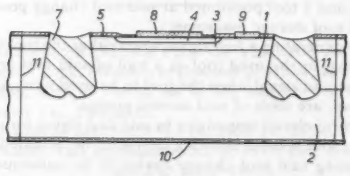
implanting doped regions of a doping type opposite to that of the doped substrate into the surface of the semiconductor by directing an ion beam upon said steps and electrodes, said steps and electrodes being employed as a mask in such a manner that the insulating steps of substantial thickness which are not covered with said metallic layer are opaque to the ion beam and that the insulating steps of small thickness which are not covered with said metallic layer are transparent to said ion beam, and

connecting each electrode to a control line.

4,019,248
HIGH VOLTAGE JUNCTION SEMICONDUCTOR DEVICE FABRICATION

Christopher Thurson Black, Bedford, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed June 16, 1975, Ser. No. 587,516
Claims priority, application United Kingdom, June 14, 1974, 24680/74
Int. Cl.² B01J *17/00*
U.S. Cl. 29—583 **20 Claims**



1. In a method of fabrication semiconductor devices having a junction capable of withstanding high reverse voltages, the steps of:

a. providing at a surface of a semiconductor body a first semiconductor region of one conductivity type in a second semiconductor region of opposite conductivity type to define a junction therebetween;

b. mechanically cutting a plurality of closed contour channels extending through said first semiconductor region and into said second region but only partly through the thickness of said semiconductor body to define respective plane areas of said junction each said area having a peripheral boundary defined by a wall portion of a respective said channel, wherein said wall portion of each said channel and said semiconductor body surface define a substantially constant included angle not greater than a right angle;

c. chemically etching surfaces of said channels to remove semiconductor material damaged by said mechanical cutting;

d. filling each said channel with an insulating glass for passivating said junction;

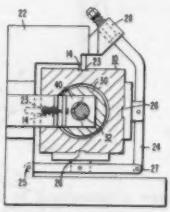
e. separating said semiconductor body into individual chips each having a peripheral boundary within which a said closed contour channel is located and spaced therefrom; and

f. encapsulating said chip in a moldable electrically insulating synthetic resin material against which said insulating glass provides a barrier to contamination of said junction by said encapsulating material thereby enabling said junction to withstand high reverse voltages.

4,019,249
METHOD AND FIXTURE FOR THE ASSEMBLY OF DYNAMOELECTRIC MACHINES

Charles F. Irvin, Sugar Creek Township, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1975, Ser. No. 639,338
Int. Cl.² H02K *15/00*
U.S. Cl. 29—596 **6 Claims**



1. A method of assembly of a dynamoelectric machine with proper alignment of rotating parts in relation to stationary parts, comprising the steps of:

stacking a plurality of stator core laminations to form a core stack having a predetermined distance between a central bore and control surfaces of said stack removed from said bore;

placing said core stack in a fixture wherein said core stack is held at said control surfaces;

placing a shaft mounted rotor within said bore of said core stack and holding said rotor in fixed position by said fixture wherein said rotor is held along a shaft center line at points which are fixed relation to said control surfaces of said stack, said rotor being held in spaced relation from said stator with an air gap therebetween free of supporting elements;

placing an end bell containing a bearing over a first shaft extension of said rotor; and,

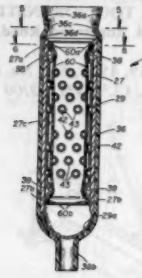
securing said end bell and said core stack together.

4,019,250

METHODS OF FABRICATING A CONNECTOR WITH A PERFORABLE INSULATIVE LINER

Henry C. Bassett, Addison; Charles A. From, Jr., Elmhurst, both of Ill.; John F. Parker, Dubuque, Iowa, and Ansel A. Worley, Lombard, Ill., assignors to Western Electric Company, Inc., New York, N.Y.

Filed July 21, 1975, Ser. No. 597,742
Int. Cl.² H02G 15/00
U.S. Cl. 29—629 30 Claims



1. In a method of assembling electrical connectors of the deformable type, wherein at least one metallic sleeve is formed with a spaced array of inwardly projecting insulation-piercing tangs, and wherein an insulative, open-ended jacket surrounds said sleeve, the improvement comprising the step of:

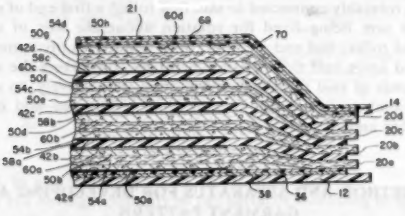
positioning a perforable insulative liner adjacent said sleeve so as to overlie the distal ends of said tangs, and extend continuously in both the circumferential and longitudinal directions as a single-wall liner, with no overlapped regions in said sleeve, and with no discontinuities at least to the borders of the array of tangs formed in said sleeve.

4,019,251

FLAT BATTERY AND METHOD OF MANUFACTURE

Thomas P. McCole, South Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 8, 1976, Ser. No. 647,599
Int. Cl.² H01M 6/00
U.S. Cl. 29—623.2 23 Claims



1. The method for constructing flat batteries comprising the steps of

assembling a predetermined sequence of sheettype components, electrolyte and electrode active materials to define a multicell pile, said sheet-type components including current collectors externally disposed within said assemblage, electrically conductive polymeric intercell connectors and separators, said components being associated with thermaly activatable material seals peripherally and continuously disposed about the peripheries thereof and dimensioned having peripheries extending beyond the peripheries of said intercell connectors adjacent said seals;

placing cover sheet material, dimensionally stable at temperatures whereat said seal material and said polymeric connectors are dimensionally unstable, upon one said externally disposed current collector, said cover sheet transmitting heat substantially only in a transverse direction and extending over the said peripheries of said seals; and then

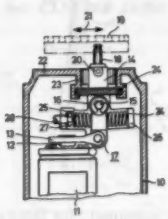
thermally sealing the periphery of said multicell pile by applying heat and pressure against said cover sheet over a peripheral area including said seal material to effect thereby a peripherally disposed seal.

4,019,252

ELECTRIC SHAVER

Werner Port, and Christian Schmieder, both of Schwalbach, Taunus, Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Germany

Filed Feb. 21, 1975, Ser. No. 551,843
Claims priority, application Germany, Feb. 28, 1974, 2409592
Int. Cl.² B26B 19/04; F16D 3/00
U.S. Cl. 30—43.92 11 Claims



1. An electric shaver comprising a housing, a shear head supported by said housing and including a first cutter and a cooperating second cutter; an electric motor having a rotatable output shaft; motion-transmitting linkage means connecting said output shaft with one of said cutters for imparting oscillatory movement to said one cutter in response to rotation of said output shaft, said linkage means including a crank member connected with and oscillatable by said output shaft, a swing arm member connected with said one cutter, and a joint connecting said swing arm member with said crank member and including a joint member having a spherical surface and a pair of socket members each surrounding and in contact with a portion of said spherical surface, said members all having sufficient spacing from one another except for the contact of said socket members with said spherical surface, so that said members are free to perform relative tumbling movements about the center of said spherical surface; journalling means for journalling said crank member on said shaft member; and a universal joint connecting said journalling means to said crank member.

4,019,253

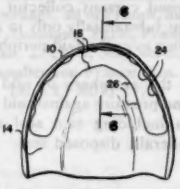
MEANS AND METHOD FOR PRODUCING CUSTOM ARTIFICIAL DENTURES

Mitchell M. Hazar, Phoenix, Ariz., assignor to American Denture Corporation, Scottsdale, Ariz.

Filed Oct. 29, 1975, Ser. No. 626,851
Int. Cl.² A61C 9/00
U.S. Cl. 32—19 10 Claims

1. An impression tray for producing artificial dentures comprising: a tray member adapted generally to conform loosly with an edentulus ridge of a patient's mouth; said tray provided with a generally U-shaped recessed portion having a

generally U-shaped opening in said U-shaped recessed portion adapted to hold a generally U-shaped stringer of artificial



teeth such that said artificial teeth of said stringer project through said U-shaped opening.

4,019,254

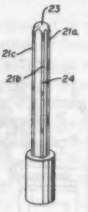
ENDODONTIC OPERATING INSTRUMENT

Oscar Malmin, 127 E. Wayne Ave., Akron, Ohio 44301

Filed June 30, 1975, Ser. No. 591,693

Int. Cl.² A61C *5/02*

U.S. Cl. 32—57 **4 Claims**



1. An endodontic instrument for insertion into a root canal, comprising;

A. an elongate flexible shank;

B. grasping means carried on one end of said shank;

C. the remaining end of said shank being blunt; and

D. a quantity of abrasive material carried by said blunt end of said shank

1. whereby said blunt end of said shank may form a seat in said root canal for reception of endodontic sealing material.

4,019,255

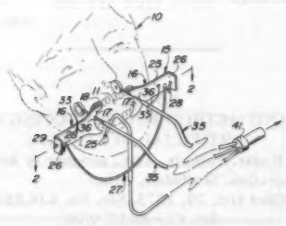
DENTAL APPARATUS FOR CHEEK RETRACTION AND SALIVA COLLECTION

Morton Cohen, Suite 604, Fox Pavilion, Jenkintown, Pa. 19046, and Elliott Silverman, 4829 Atlantic Ave., Ventnor, N.J. 08406

Filed Oct. 16, 1975, Ser. No. 623,103

Int. Cl.² A61C *17/04*

U.S. Cl. 32—33 **14 Claims**



1. In a dental apparatus, a pair of cheek retractor elements each comprising a hook part for engaging a patient's lips at a respective side of the mouth, a shank part extending from each hook part outwardly away from each other and the patient's mouth entirely exteriorly thereof, connector means on an outer region of each shank part remote from the patient's mouth, and a resiliently contractile element extending between and connected to said connector means for yieldably urging the latter apart, said contractile element being generally curved in use to extend in spaced relation exteriorly about the patient's mouth and present no obstacle to the dental operator.

4,019,256

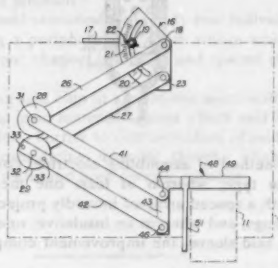
GUIDE FOR TOOL OR INSTRUMENT

Lance A. Johnson, 774 Edgewood Road, San Mateo, Calif. 94402

Filed Dec. 19, 1975, Ser. No. 642,456

Int. Cl.² B43L *13/00*

U.S. Cl. 33—79 A **7 Claims**



1. A guide for a tool to be used on a work piece comprising a straight-edge element adapted to be fixed relative to said work piece, an angle-selector plate attached to said element, a first arm, a second arm of equal length to said first arm, first and second pivot means pivotally connecting the first ends of said first and second arms, respectively, to said angle-selector plate, said first and second pivot means being spaced apart a first distance, a first roller mounted in a fixed position on the second end of said first arm, a second roller mounted rotatably on the second end of said second arm, said rollers being of the same diameter, said diameter being equal to said first distance, rotation means to maintain said rollers in tangential contact and to cause said rollers to turn in opposite directions through identical angles, third and fourth arms of equal length and equal to said first and second arms, a first end of said third arm being rotatably connected to said first roller, a first end of said fourth arm being fixed for rotation about the axis of said second roller, and end-member, third and fourth pivot means spaced apart said first distance pivotally connecting the second ends of said third and fourth arms, respectively, to said end-member, and a tool locator fixed relative to said end-member and shaped to receive said tool.

4,019,257

METHOD AND APPARATUS FOR DEVELOPING A GARMENT PATTERN

George Cavrich, 1285 Madison Ave., New York, N.Y. 10028

Continuation-in-part of Ser. No. 245,131, April 18, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 427,453

Int. Cl.² A41H *3/00*

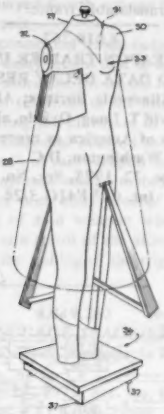
U.S. Cl. 33—17 R **6 Claims**

1. A method of making a garment pattern comprising the steps of

1. adjusting a mannequin characterized by at least one moveable contour element to establish a contour of said mannequin corresponding to a predetermined style of garment for which a pattern is desired;

2. positioning a self-supporting shell over the mannequin as adjusted so that said shell is supported on the mannequin at the shoulders, bust and back thereof;

3. cutting the shell on at least one side to remove excess material therefrom while at substantially the same time and thereafter shaping the remainder of the shell to the contour of the mannequin and securing the shell in that contour thereby imparting to it a style corresponding to said predetermined style;



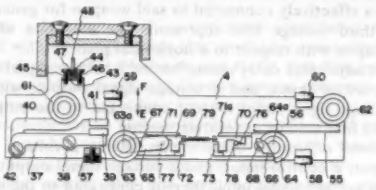
4. making markings on the shell while it is still on the mannequin to delineate patterns for the several pieces of the garment intended to be produced, and
5. cutting the shell along said markings to generate a plurality of pattern pieces of three-dimensional configuration.

4,019,258

DEVICE FOR ATTACHING ROLLERS TO A CARRIAGE ADAPTED TO MOVE ALONG A RAIL

Tadayoshi Iwai, Tokyo, Japan, assignor to Mutoh Industry Ltd., Tokyo, Japan

Continuation of Ser. No. 538,779, Jan. 6, 1975, abandoned. This application Feb. 13, 1976, Ser. No. 658,015
Int. Cl.² B43I *13/02*
U.S. Cl. 33—79 R **3 Claims**



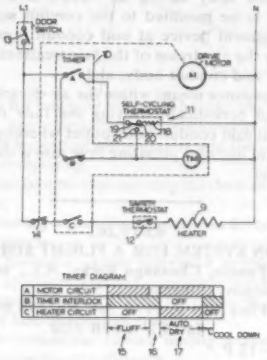
1. In a drawing apparatus, the combination of:
a rail having a plurality of rail surfaces extending longitudinally thereof;
a carriage slidably mounted on said rail for movement therealong;
first rollers rotatably mounted on said carriage and positioned against one of the rail surfaces of said rail;
at least one guide member on said carriage;
presser means including at least one member engaged with said guide member on said carriage for linear movement along said guide member and having thereon a surface gently inclined with respect to the direction of said linear movement;
abutment means positioned in the path of movement of said inclined surface on said one member of said presser means and engaged by said inclined surface during said linear movement;
mounting means on which said abutment means is mounted for movement of said abutment means towards and away from another to said rail surfaces;
at least one further roller mounted on said abutment means;
resilient means engaged with said one member of said pressure means for moving said one member toward said abutment means; and
blocking means movably mounted on said carriage for movement into and out of the path of movement of said one member of said presser means at a position to block movement of said one member toward said abutment means at a position where said further roller is out of contact with said another of said rail surfaces.

4,019,259

AUTOMATIC REGULATION OF DRYING TIME IN A CLOTHES DRYING MACHINE

Pierre H. Veraart, Mississauga, Canada, assignor to GSW Appliances Limited, Weston, Canada

Filed Oct. 15, 1974, Ser. No. 514,296
Int. Cl.² F26B *19/00*
U.S. Cl. 34—48 **6 Claims**

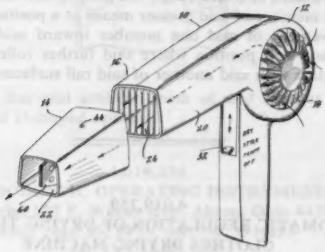


1. In a clothes dryer, a heater for drying a clothes load placed in the dryer, means for energizing said heater to initiate clothes drying, and means to regulate drying time in accordance with the size of clothes load placed in the dryer to dry the clothes to a predetermined degree of dryness and to thereafter terminate drying, said regulating means comprising signal generating means operatively responsive to the cooling effect of the clothes load during heater energization without altering heater energization and means responsive to signals generated by said signal generating means for terminating heater energization when said signal indicates that the clothes have reached the predetermined degree of dryness, said signal generating means comprising a self-cycling thermostat having an internal heater, a bi-metal element carrying at least one contact and at least one fixed contact, said contacts being closed to energize said internal heater initially upon energization of said dryer heater, the heat from said internal heater acting on said bi-metal element effecting opening of said contact and de-energization of said internal heater, and the cooling effect of the clothes load acting on said bi-metal element upon opening of said contacts and effecting closing of said contacts and energization of said internal heater, whereby the thermostat is rendered self-cycling at a rate and duty cycle corresponding to said cooling effect and said means responsive to said signal generating means comprises means responsive to the rate of cycling and duty cycle of said self-cycling thermostat.

4,019,260
HAIR TREATMENT METHOD AND DEVICE

Emanuel Edward Levy, Ridgefield, and Martin Jay Wolff, West Haven, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.

Filed June 4, 1975, Ser. No. 583,613
Int. Cl.[2] A45D *20/00*
U.S. Cl. 34—97 32 Claims



1. An adaptor for attachment to a hair treatment device having a housing therefor including a conduit segment and means for establishing an air stream which flows from an aperture of said conduit segment, comprising:

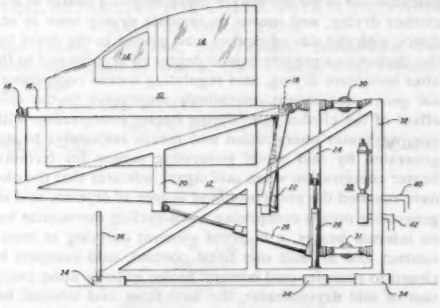
a. a conduit body having an outlet, said conduit body adapted to be mounted to the conduit segment of said hair treatment device at said conduit segment aperture whereby the air stream of the hair treatment device flows through said conduit body; and,

b. flow impedance means within the air stream for automatically and periodically varying the flow rate of the air stream at said conduit body outlet whereby a continuous air stream having a pulsating flow rate is discharged from the outlet.

4,019,261
MOTION SYSTEM FOR A FLIGHT SIMULATOR

Edward G. Pancoe, Chenango Forks, N.Y., assignor to The Singer Company, Binghamton, N.Y.

Filed May 9, 1975, Ser. No. 576,092
Int. Cl.[2] G09B *9/08*
U.S. Cl. 35—12 P 17 Claims



1. A system for imparting motion to a cockpit of a grounded flight trainer, comprising:

first frame means for supporting said cockpit for rotation about a longitudinal axis;

a vertically translatable frame, at least a portion of said frame being disposed behind said first frame means;

second means located between the rear of said first frame means and said frame portion for pivotally connecting the rear of said first frame means to said frame portion;

linear actuator means connected between the first frame means and said portion of the vertically translatable frame for pivoting said first frame means about said second means;

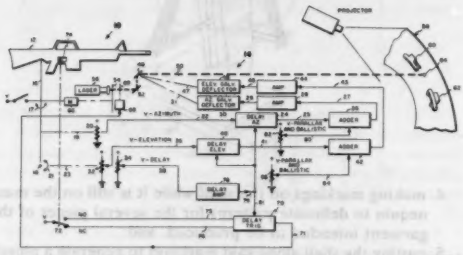
a fixed frame; and

third means for connecting said vertically translatable frame to said fixed frame in a four-bar parallelogram linkage including at least one torque tube for laterally restraining said vertically translatable frame.

4,019,262
DIRECT FIRE WEAPON TRAINER INCORPORATING HIT AND DATA DELAY RESPONSES

Denis R. Breglia, Altamonte Springs; Alfred H. Rodemann, Maitland, and David T. Long, Oviedo, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 22, 1975, Ser. No. 642,880
Int. Cl.[2] F41G *3/26*
U.S. Cl. 35—25 12 Claims



1. A weapon fire simulator system for training a marksman to shoot a predetermined weapon accurately at a predetermined target means, comprising in combination:

an imitation weapon having a trigger for effecting the simulated firing thereof;

means slave connected to said weapon for generating a first voltage that represents the elevation thereof with respct to a horizontal plane;

means slave connected to said weapon for generating a second voltage that represents the azimuth thereof with respect to a vertical plane;

means effectively connected to said weapon for generating a third voltage that represents the elevation of said weapon with respect to a horizontal plane;

a first adjustable delay means having a voltage signal input, a control input, and a voltage signal output, with the voltage signal input thereof connected to the output of said first voltage generating means;

a second adjustable delay means having a voltage signal input, a control input, and a voltage signal output, with the voltage signal input thereof connected to the output of said second voltage generating means;

a third delay means having an input and an output, with the input thereof connected to the output of said third voltage generating means, and with the output thereof connected to the control inputs of said first and second adjustable delay means;

a normally open trigger switch having terminals and being connected to the trigger of said weapon in such manner as to be closed upon the firing thereof;

a fourth voltage effectively connected to one of the terminals of said normally open trigger switch;

an adjustable delay trigger circuit having a voltage input, a control input, and an output, with the voltage input thereof connected to the other terminal of said normally open trigger switch, and with the control input thereof connected to the output of said third delay means;

emitter means spatially disposed from said screen for timely projecting a predetermined radiation beam along a predetermined path;

reflective means disposed between the aforesaid screen and said emitter means in the path of the radiation beam projected thereby for effecting the redirection thereof;

normally closed shutter means effectively connected to the output of said adjustable delay trigger circuit and physically disposed in the path of the radiation beam projected by the aforesaid emitter means for effecting the passing of said radiation beam toward said reflector means in response to the delayed fourth voltage from said adjustable delay trigger circuit;

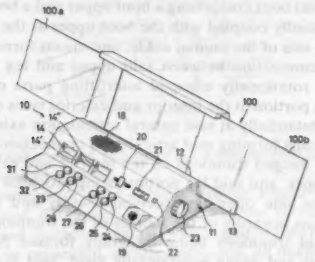
means effectively connected to the outputs of the aforesaid first and second delay means and to said reflective means for indexing the aforesaid projected radiation beam redirected thereby in response to the aforesaid delayed first voltage representing the elevation of said weapon and in response to the aforesaid delayed second voltage representing the azimuth of said weapon in such manner as to position said projected radiation beam on said display screen as a hit or miss mark thereof in correspondence with the aiming of said weapon when said weapon is effectively fired as a result of the aforesaid trigger switch being closed by the pulling of the trigger thereof.

4,019,263

CARD TYPE LANGUAGE TEACHING APPARATUS

Roku Sakuma, Tokyo, Japan, assignor to Ryobi, Ltd., Fuchu, Japan

Filed Sept. 17, 1975, Ser. No. 614,177
Int. Cl.² G09B *19/04*
U.S. Cl. 35—35 C **16 Claims**



16. In a language teaching apparatus comprising: a body formed with an upright guide slot; card drive means including capstan means rotatable back and forth, and first pressure means movable towards said capstan means; magnetic reproduce means including at least one reproduce head for magnetically reproducing an audio information, and second pressure means movable towards said reproduce head; mechanical means actuatable for rotating said capstan means and for selectively moving the first- and second-named pressure means; electric circuit means controllable for actuating said mechanical means; and manual control means manually actuatable for controlling said electric circuit means;

a teaching card assembly sized to horizontally run in the upright guide slot of said body in the forward and backward directions, when urged by the first-named pressure means into contact with said capstan means and driven thereby, said teaching card assembly comprising:

a first sheet having a key visual information; and

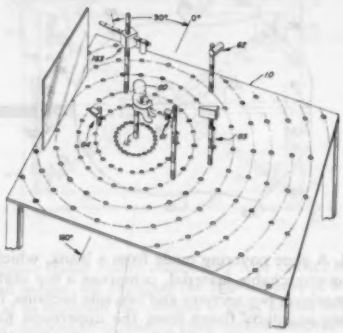
a second sheet having an additional visual information, at least one of the first- and second-named sheets being made of a transparent material so that the key and additional informations may be observed as a visual information of a suspended meaning when the two sheets are placed one on the other, the second-named sheet having at least one magnetically recording horizontal medium, in which at least one question concerning the superposed visual information and also at least one answer corresponding to the question are recorded as an audio information, said second-named sheet having a plurality of image slides concerning the superposed visual information for a projecting purpose.

4,019,264

PHOTOGRAPHIC TEACHING APPARATUS UTILIZING A THREE-COORDINATE REFERENCE SYSTEM

Henry Matthew Gall, 144-22 22nd Road, Whitestone, N.Y. 11357

Filed Apr. 23, 1975, Ser. No. 570,613
Int. Cl.² G09B *25/00*
U.S. Cl. 35—53 **1 Claim**



1. Apparatus for teaching portrait photography by illustrating the height, angle and distance relationship between the equipment used in portrait photography and the subject to be photographed comprising:

a horizontal surface for representing the floor of a photography studio;

said surface having a plurality of apertures forming a predetermined pattern;

said pattern having a center reference aperture and the remaining apertures forming concentric circles with said center reference aperture being the common center point for each of said concentric circles;

each of said concentric circles having a predetermined radius representing the distance

from said center aperture;

a subject model means for inserting into said center reference aperture;

said subject model means comprising:

a subject head means for representing the subject to be photographed and,

a subject support means extending from said subject head means and adapted for insertion into said center aperture;

a plurality of equipment model means for inserting into said remaining apertures forming said concentric circles;

said equipment model means comprising:

a head means for representing the equipment, and an equipment support means extending from said head means and adapted for insertion into one of said remaining apertures forming said concentric circles;

said subject support means and said equipment support means having predetermined marked graduations related to the radius of said concentric circles so that said subject model means is insertable into said center reference aperture to represent the height of the subject to be photographed and said equipment model means are insertable into said remaining apertures to represent the distance and angle from the subject to be photographed and the height of the equipment; and,

a card for recording the distance and angle from said center reference aperture and the height above said horizontal

surface of said equipment models when inserted into said plurality of apertures and the height above said horizontal surface of said subject model when inserted into said center reference aperture.

4,019,265

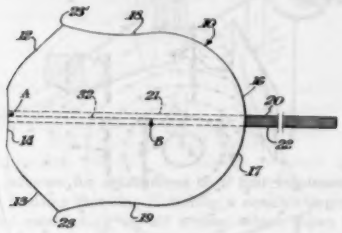
UNIVERSAL SIZE DISPOSABLE SHOE COVER

Louis S. Epstein, c/o Melco, Inc. 6603 Governor Printz Blvd., Wilmington, Del. 19809

Continuation of Ser. No. 338,916, March 7, 1973, Pat. No. 3,898,750. This application Mar. 13, 1975, Ser. No. 558,065

Int. Cl.² A43B *3/16, 23/00*

U.S. Cl. 36—7.1 R **8 Claims**



1. A shoe covering made from a blank, which blank, made from stretchable material, comprises a top section, a bottom comprising two sections and two side sections, the top section being angularly flared from the uppermost part of the top section toward the respective side section, said bottom sections being rounded toward the respective side sections and being flat, the terminal of each rounded bottom section being joined to the terminal of its respective angularly flared top through a curve comprising said side sections, the said covering being formed by a sewing together of the said two angularly flared parts at their edges that meet in a folded form of said blank, said sewing thereby forming a vamp for said shoe in the preparation of said covering.

4,019,266

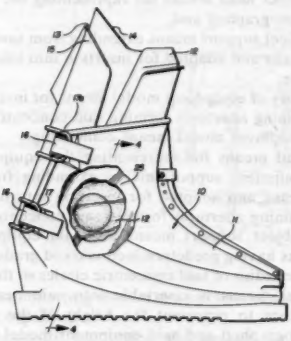
ANKLE PAD FOR FOOTWEAR

Alden B. Hanson; Chris A. Hanson, and Donald W. Bertetto, all of Boulder, Colo., assignors to Hanson Industries Inc., Boulder, Colo.

Filed Mar. 4, 1976, Ser. No. 664,042

Int. Cl.² A43B *5/04*

U.S. Cl. 36—119 **9 Claims**



1. An ankle pad insert in a boot having a relatively stiff shell and a liner disposed within said boot shell and conforming about the foot and ankle area of an individual, said liner having an inner wall and an outer wall,

said outer wall being recessed in the area of the portion of said liner at the location where said ankle joint of a wearer of the boot would contact said liner,

said recessed area being substantially filled with said ankle pad insert,

said ankle pad insert comprising a material which is less dense than the density of said liner material whereby said ankle pad insert conforms to the ankle joint of a wearer.

4,019,267

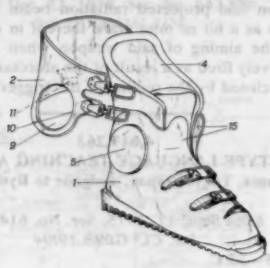
SKI BOOT STRUCTURE

Marc Sadler, Paris, France, assignor to Dorofix Design Establishment, Eschen, Liechtenstein

Filed Jan. 7, 1976, Ser. No. 647,149

Int. Cl.² A43B *5/04*

U.S. Cl. 36—120 **3 Claims**



1. A ski boot comprising a boot upper and a boot leg portion articulatedly coupled with the boot upper at the natural articulation axis of the human ankle, and means forming an articulation connection between said upper and leg portion comprising rotationally engaged interfitting parts on said upper and leg portion at the interior and exterior sides of the ski boot and substantially at said natural articulation axis of the ankle, said means forming said articulation connection comprising a pair of flanged trunnions on the interior and exterior sides of said upper, and said leg portion being provided with a pair of opposite side openings receiving closely and rotatably said trunnions inwardly of the flanges of the trunnions, said upper and said trunnions being integrally formed from synthetic material and being substantially rigid, said trunnions being substantially cylindrical, and said openings of the leg portion being substantially circular.

4,019,268

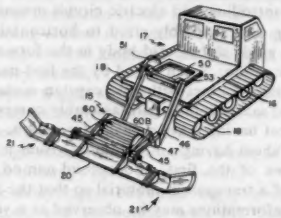
APPARATUS FOR COMPACTING SNOW FOR SKIING

Donald Herbert Waterman, Poland Springs, Maine, assignor to Valley Engineering, Inc., Gray, Maine

Filed Nov. 1, 1976, Ser. No. 737,522

Int. Cl.² B30B *9/00*

U.S. Cl. 37—10 **8 Claims**



1. An apparatus for compacting snow for sking comprising, an elongate central section having a substantially flat bottom wall,

first elongate frame means substantially parallel to said central section when viewed from the top,

means for securing said first elongate frame means to said central section,

second elongate frame means substantially parallel to said first elongate frame means and located forwardly thereof,

first pivot means located substantially at the centers of said first and second frame means for providing pivotal movement of said first frame means and said central section relative to said second frame means, and

third elongate frame means secured to said second frame means and extending substantially normal thereto,

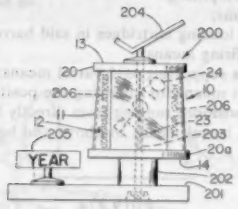
whereby as the compacting apparatus is moved forwardly over uneven terrain and one end portion of said central section contacts an elevated snow surface the said one end portion of the central section moves upwardly about said first pivot means thus substantially equalizing the p.s.i. exerted by said substantially flat bottom wall against the snow being compacted.

4,019,269

GRAPHIC EXHIBITOR TROPHY

Lloyd J. Vix, R.R. 1, Houston, Minn. 55943

Filed Oct. 24, 1975, Ser. No. 625,444
Int. Cl.² G09F *3/20*
U.S. Cl. 40—19 7 Claims



1. A graphic award exhibitor for a displayable trophy, comprising in combination:

a. a transparent rigid tubular display window having an exposed outer face, an inner window surface having a tapered contour against which graphic award material may be presented, a closed end, and, an openable end for insertion and removal of graphic material in the window;

b. a flexible initially rectangular and flat window liner formable to the contour of the window tapered inner surface and sized to completely cover the inner surface, the liner being inserted within the window and pressed against the inner surface by the stress within the liner when formed to the contour of and placed within the window inner surface, the liner being removable from the window and returnable to the flat form, having a surface upon which a graphic message may be written, being re-formable and re-insertable in the window after application of the graphic message with the graphic message facing against the window inner surface, being visible through the window, and forming at least part of a graphic award, the liner having initially parallel edges which climb angularly around the tapered inside window contour and inward from each window end;

c. a peripheral rim wit an opaque annular flange about the closed end of the window, the flange having height on the window greater than the angular climb of the lines from the closed window end, for visually concealing the angular liner climb on the closed end; and

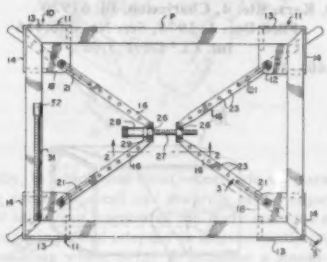
d. A removable opaque end cap having a peripheral rim with an annular flange snap-fitted to and about the open end of the window and retaining the cap to the window, the cap forming a retainer for retention of the liner within the window and being manually removable from the window by disengagement of the rim flange, for access to, removal of and re-insertion of the liner, the end cap being re-snap-fittable to the window for retention of a re-inserted liner, and the flange having a height on the window greater than the angular climb of the liner from the openable window end, for visually concealing the angular liner climb on the closed end.

4,019,270

MITRE FRAME CLAMP

Leonard D. Trowbridge, 16200 Woodbridge, Harvey, Ill. 60426

Filed Mar. 27, 1975, Ser. No. 562,571
Int. Cl.² G09F *1/12*
U.S. Cl. 40—155 5 Claims



1. A picture frame clamp comprising four corner brackets having wall means, for engaging the four corners of a picture frame so as to maintain the corners at right angles relative to each other, diagonally extending strap means attached to each of said corner brackets, space blocks connecting said straps at one end to form two pairs of strap means, an adjusting screw extending through said blocks to move said corner brackets inwardly and outwardly relative to each other, a thumb piece fixed to one end of said adjusting screw, and a thrust-bearing between said thumb piece and an adjacent block.

4,019,271

METHOD FOR MANUFACTURING A DISPLAY PORTION THEREOF

Kenneth James Latimer, 1088 Garnette St., Salt Lake City, Utah 84106

Filed Oct. 6, 1975, Ser. No. 619,796
Int. Cl.² G09F *7/00*
U.S. Cl. 40—125 H 14 Claims

1. A portable sign comprising,

a base constructed so as to be capable of being nested with a like base;

a mast, arranged to be releasably connected at its base end to said base in a vertical attitude, extending upwardly therefrom;

means for releasably connecting said mast, at its base end, to said base;

means for releasably locking the base end of said mast to said base;

a cross arm installable to said mast to extend across said mast;

means for releasably installing said cross arm to said mast;

a sign display portion for arrangement across said mast and cross arm; and,

means for releasably connecting said sign display portion across said mast and cross arm.

4,019,272

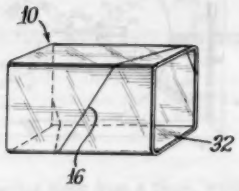
IDENTIFICATION MARKER

Phillip D. Kerz, Rte. 4, Charleston, Ill. 61920

Filed Dec. 1, 1975, Ser. No. 636,416

Int. Cl.² G09F 3/06

U.S. Cl. 40—316 1 Claim



1. An identification marker for application to an elongated article in the form of a rod, comprising,

a tubular sleeve of polygonal cross section made of a strip of flexible pre-stressed spring material having helical turns normally in contracted condition of pre-formed shape with adjacent turns in edge-to-edge inter-engaging relation and thereby forming an axially and circumferentially continuous tube,

the turns being flexible outwardly by the fingers of the user to a relatively large-diameter condition of the sleeve, and further flexible to an open position in which the turns provide an open side extending longitudinally, to enable the sleeve to be applied to and removed from the article in transverse direction, and upon release of pressure for opening the turns, the turns return to contracted condition in surrounding relation to the rod,

the sleeve when on a rod of a first diameter no greater than the internal side-to-side dimension of the sleeve, being in fully contracted condition in which the adjacent turns inter-engage,

the sleeve including substantially more than a single turn, whereby to enable the sleeve to be flexed outwardly and spread to a substantially increased transverse size to surround a rod of substantially greater diameter than said first diameter with the turns completely surrounding the rod, and there thus being no portion of the rod circumferentially that is not surrounded by the sleeve,

the turns due to their helical positioning being each in full gripping engagement with the rod at points throughout the full circumferential extent of itself and of the rod and thereby performing its full incremental part in holding the marker on the rod, the turns being in such full gripping engagement in the case of rods of any diameter throughout a wide range including said first diameter as the smallest,

the sleeve being constituted solely by said turns whereby the marker does not include any portions extending axially beyond the ends of the marker itself and the marker is thereby held on the rod solely by the engagement of the turns with the rod,

the turns being free of all mechanical interconnection, and

the sleeve being provided with identification indicia in intaglio form on its outer surface.

4,019,273

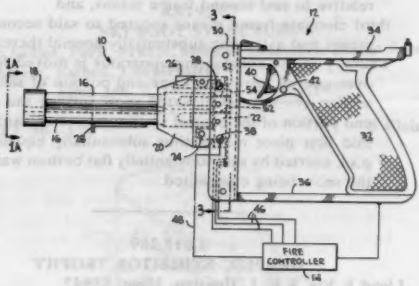
THREE-BARREL PISTOL, ELECTRODE FIRED

Ralph J. Kibler, Phoenix, and Otho C. Wolfe, Darlington, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 7, 1976, Ser. No. 693,401

Int. Cl.² F41C 27/00, 19/12

U.S. Cl. 42—1 R 9 Claims



1. A pistol for determining design parameters for a hand-held weapon comprising:

1. barrel means;

2. means for loading cartridges in said barrel means;

3. cartridge firing means;

4. grip means supporting said barrel means; and

5. adjustment means for changing the position of said grip means to positions ranging from directly behind the center of said barrel means to above and below said barrel means.

4,019,274

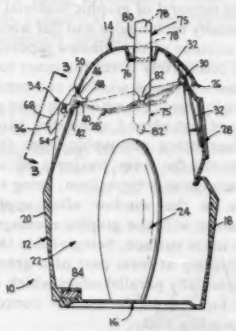
TROLLING BUCKET WITH LOADING LATCH MEANS

Harper Landell, and John M. Michel, both of Downingtown, Pa., assignors to Woodstream Corporation, Lititz, Pa.

Filed Sept. 20, 1976, Ser. No. 724,753

Int. Cl.² A01K 97/04

U.S. Cl. 43—55 12 Claims



1. A trolling bucket for carrying live bait or the like comprising:

a generally closed, hollow, shell having a forward end, a rearward end, an upper wall and a lower wall together defining a chamber within said shell;

portions of said upper wall of said shell defining an opening to provide access to said chamber;

door means generally corresponding in shape to said opening;

hinge means securing said door means to said upper wall of said shell adjacent said opening for movement of said

door means between a closed position in which said door means substantially blocks said opening and precludes escape of bait or the like from within said chamber, and an opened position in which said door means is spaced from said opening interiorly of said chamber to thereby unblock said opening and permit bait or the like to be placed within, or removed from, said chamber;

door biasing means normally urging said door means into said closed position;

latching means including latching portions located interiorly of said shell for engaging and releasably holding said door means against the urging of said door biasing means when said door means is moved to said opened position; and

releasing means for releasing said door means from its holding relationship with said latching means to permit said door means to be moved to said closed position by said door biasing means, said releasing means including portions located exteriorly of said shell for actuating said releasing means.

4,019,275

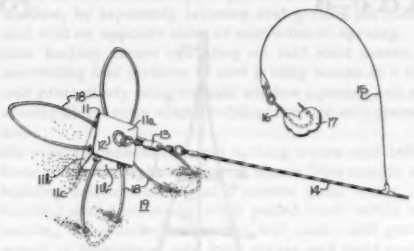
FISHING SINKER

George T. Ruppe, P.O. Box 542, Kings Mountain, N.C. 28086

Filed Mar. 23, 1976, Ser. No. 669,692

Int. Cl.² A01K *95/00*

U.S. Cl. 43—44.96 **7 Claims**



1. A fishing sinker adapted to withstand the tendency of surrounding flowing water to rapidly displace the same comprising a weighted body having a relatively large base portion and a relatively small tapered end, means carried by the base portion of said body for attaching a fishing line thereto, a plurality of relatively broad skeletal fins secured to said tapered body adjacent the base portion of said body and extending outwardly generally radially around said body, said fins being secured to said body so that the width of the fins extends generally in the same direction as the width of the body, and the radial extent of said fins being substantially greater than the widest portion of said tapered body and thereby being adapted to effectively serve to engage the floor of the fishing bed to facilitate maintenance of the sinker in its cast location, while being readily retrievable.

4,019,276

AUTOMOBILE TOY

Shinroku Nakao, Yokohama, Japan, assignor to Combi Co., Ltd., Tokyo, Japan

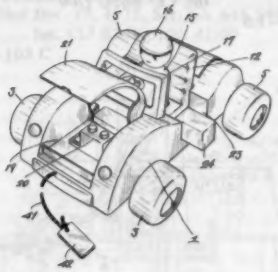
Filed July 1, 1975, Ser. No. 592,163

Claims priority, application Japan, July 4, 1974, 49-78923[U]; July 5, 1974, 49-79602[U]

Int. Cl.² A63H *17/25*

U.S. Cl. 46—99 **7 Claims**

1. An automobile toy which comprises in combination a body, a front wheel axle extending across the front portion of said body and coaxially supporting front wheels at the extreme opposite ends, a rear wheel axle exending across the rear portion and eccentrically supporting rear wheels at the extreme opposite ends so as to move said body upwardly and downwardly as said rear wheels are rotated when the automobile toy is moved, said body defining a driver's compartment between said front and rear portions thereof, a driver figure doll loosely received in said driver's compartment for rocking movement back and forth as said body moves upwardly and



downwardly, in which said front wheel axle supports a sound producing wheel adjacent and inwardly of the adjacent front wheel and said front portion of the body includes a resilient metallic engaging piece adapted to intermittently engage said sound producing wheel so as to produce a sound intermittently as said automobile toy is moved upwardly and downwardly.

4,019,277

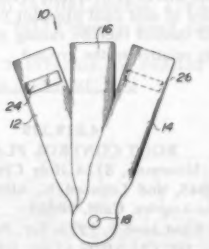
COMBINED FAN AND NOISEMAKER

Charles W. Kenkelen, Philadelphia, Pa., assignor to Melvin G. Rabin, El Paso, Tex.

Filed Jan. 12, 1976, Ser. No. 648,592

Int. Cl.² A63H *5/00*

U.S. Cl. 46—175 R **3 Claims**



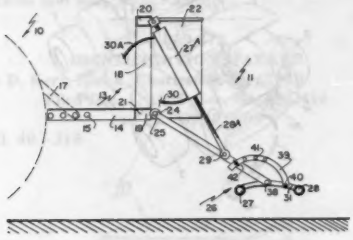
1. A combined fan and noisemaker comprising a pair of outer blades, an anvil blade disposed intermediate said outer blades, each outer blade having a protuberance adjacent one of said outer blade's ends, which protuberance is juxtaposed to a face of said anvil blade when said outer blade is juxtaposedly aligned with said anvil blade, and means for pivotably securing together said outer and anvil blades at a point remote from said protuberances about an axis perpendicular to their major faces whereby said outer blades may be selectively pivoted to an open fan-like disposition, or may be aligned in juxtaposed relationship so that said outer blades may be percussively struck on said anvil blade.

4,019,278

DEVICE FOR THE APPLICATION OF CHEMICALS TO FIELD CROPS AND/OR OTHER PLANT CONCENTRATIONS

James A. McKirdy, 140 Oakdean Blvd., Winnipeg, Canada

Filed Feb. 19, 1976, Ser. No. 659,246
Claims priority, application Canada, Feb. 24, 1975, 220668
Int. Cl.² B05C *1/00*
U.S. Cl. 47—1.5 **12 Claims**



1. A weed bar assembly for use with a liquid such as a herbicide or the like adapted to be supported upon a source of power such as a tractor, said source of power including a source of hydraulic pressure; comprising in combination supporting framework, said supporting framework adapted to be operatively connected to said source of power, a tank associated with said framework for holding a supply of liquid, at least one hollow weed bar assembly supported transversely by said supporting framework and extending upon each side thereof means to adjust the height of said week bar assembly relative to the ground, means operatively connecting said tank with the interior of said weed bar assembly, said weed bar assembly including means in the wall thereof for feeding said liquid through the wall to maintain a film of said liquid upon the outer surface of said wall, said weed bar assembly including a pair of spaced and parallel tubes, means to adjust the fore and aft relationship of said tubes relative to the ground, said means to adjust the height of said weed bar assembly relative to the ground including a pair of links pivoted by one end thereof to said supporting structure and being pivotally connected by the other ends thereof to said weed bar assembly, and a fluid operator extending between said supporting framework and said weed bar assembly and being operatively connected to said source of hydraulic pressure whereby extension and retraction of said fluid operator pivots said links around said one end thereof thereby raising and lowering said weed bar assembly relative to the ground.

4,019,279

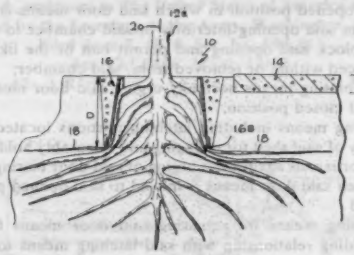
ROOT CONTROL PLANTER

Maurice D. Moorman, 8124 Holy Cross Place, Los Angeles, Calif. 90045, and Leonard N. Albrecht, 8780 Shoreham Drive, Los Angeles, Calif. 90069

Filed June 9, 1975, Ser. No. 585,048
Int. Cl.² A01G *17/00, 9/02, 11/00*
U.S. Cl. 47—25 **13 Claims**

1. In a tree installation which includes a planting location near a sidewalk or other structure which can be cracked by a root of a tree, and which also includes a tree centered on said location and which is of a kind whose roots can reach and crack the structure, the improvement comprising:

a root deflector disposed between said planting location and most of said structure, said deflector being made of a material which does not disintegrate with time and having root impenetrable smooth walls with a top at least within a few inches of ground level and with a bottom at least one foot below the top of the ground, said deflector being open at the bottom, whereby roots upon contacting said deflector are generally directed downwardly and can emerge only from the bottom of the deflector at a depth



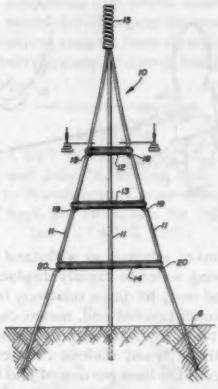
that prevents them from cracking the sidewalk or other nearby structure.

4,019,280

COLLAPSIBLE PLANT SUPPORT

James B. Summers, Lima, Ohio, assignor to NBS Incorporated, Huntsville, Ohio

Filed Oct. 6, 1975, Ser. No. 619,577
Int. Cl.² A01G *17/04*
U.S. Cl. 47—45 **7 Claims**



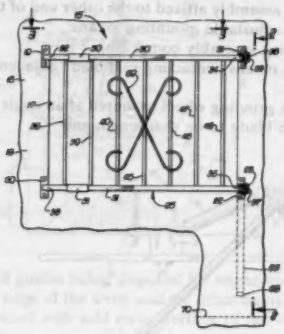
1. A collapsible plant support comprising at least three elongated legs fabricated from flexible wire rod with all of said legs being interconnected at one end, said legs being displaceable between a collapsed configuration wherein said legs are disposed in substantially parallel relationship and an expanded configuration wherein said legs are mutually divergent from their interconnected ends, and at least one helically-wound wire spring of predetermined length to extend around said legs and form a closed loop at a selected axial position along side legs when said legs are flexed to said mutually divergent configuration for support of plant elements by said spring, each end of said helical spring provided with means cooperatively interengageable to secure said spring in said closed loop configuration around said legs and supported thereon when said legs are vertically disposed and flexed to said expanded configuration, each of said legs having support means formed therewith and projecting laterally outward thereof at said selected axial position and cooperatively interengageable with said helical spring for vertical support thereof when the legs are in said expanded configuration and said helical spring is formed with an internal diameter to thread axially onto one of said legs and cooperatively interfit with said support means in retained relationship on said leg.

4,019,281

QUICK RELEASE WINDOW GUARD

Ray C. Weiler, 17386 Vine St., Fontana, Calif. 92335

Filed Mar. 1, 1976, Ser. No. 662,377
Int. Cl.² F06B 3/68
U.S. Cl. 49—56 8 Claims



1. In combination:

a grating means divided by joint means in a vertical plane into separate but interlockable sections;

means for mounting said grating means on a wall of a building so as to overlie an opening provided in said wall for a window, by separately securing said grating sections to said wall on opposite sides of said window opening;

hidden locking means operating on said joint means for assembling said sections of said grating means as a rigid unit protectively covering said window opening and preventing illegal entry of said building through said opening; and

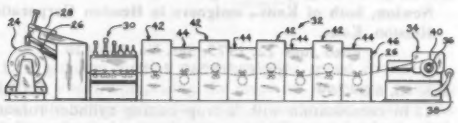
cable means connected to said locking means and hidden from access through said grating means from outside said building and terminating at a remote point within said building and functioning when pulled from within said building to unlock joint means and cause said grating means to separate at said joint means and yield readily from its normal position covering said opening and thus readily permit escape through said window in the event of fire.

4,019,282

APPARATUS FOR DESCALING METAL STRIPS

Ford B. Cauffiel, 1400 Hastings Ave., Toledo, Ohio 43607

Filed Mar. 14, 1975, Ser. No. 558,282
Int. Cl.² B24B 7/12
U.S. Cl. 51—75 12 Claims



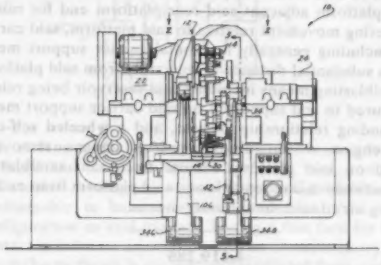
1. Apparatus for removing scale from a metal strip, said apparatus comprising an abrasive roll having a hub and a multiplicity of flexible sheets extending generally radially from said hub, said sheets having lengths which are less than the width of the metal strip, and having abrasive surfaces facing in a common direction, means for rotating said hub at high speed in the common direction, means for supporting the metal strip in contact with outer edge portions of said flexible sheets, means for moving the metal strip in a given direction between said flexible sheets and said supporting means, means mounting said abrasive roll for movement in an axial direction transverse to the direction of movement of the strip, and means movable in an axial direction with said abrasive roll for maintaining common ends of said flexible sheets substantially in alignment with a longitudinal edge of the metal strip.

4,019,283

GRINDING MACHINE LOADER ASSEMBLY

Theodore A. Mrugala, Auburn, Mass., assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Dec. 17, 1975, Ser. No. 641,540
Int. Cl.² B24B 5/04, 41/00
U.S. Cl. 51—103 C 23 Claims



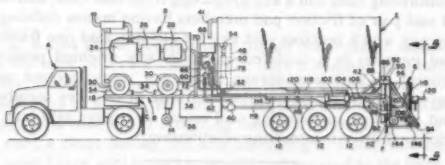
15. An apparatus for use in sequentially grinding a plurality of workpieces in a work area, said apparatus comprising a base, chuck means connected with said base for holding each workpiece in turn in the work area, grinding means for grinding each workpiece in turn while the workpiece is being held by said chuck means, and workpiece transport means for sequentially transporting workpieces to the work area, said workpiece transport means including a wheel which is rotatable relative to said base, a plurality of workpiece support means disposed on said wheel at equally spaced locations for supporting a plurality of workpieces, index motor means for effecting rotational movement of said wheel to sequentially move workpieces into the work area, and wheel support means for supporting said wheel and index motor means for movement relative to said base between an operating position in which said wheel extends into the work area and an inactive position in which said wheel is spaced apart from said work area.

4,019,284

SELF-CONTAINED SANDBLASTING APPARATUS

Fred Lee Hileman, Jr., 7433 Columbia Road, Olmsted Falls, Ohio 44138

Filed July 7, 1975, Ser. No. 593,438
Int. Cl.² B24C 3/00
U.S. Cl. 51—9 M 6 Claims



1. Self-contained sandblasting apparatus comprising: an elevated wheeled support and transport platform having releasable coupling means for releasably coupling said platform to a powered towing vehicle for transporting said platform from one location to another, said platform including front and rear platform ends, a large generally rectangular substantially closed sand receptacle mounted on said platform and having outlet means adjacent one bottom end thereof for dispensing sand therefrom, said outlet means being located

adjacent said rear platform end, receptacle power means for tilting said receptacle to raise the other bottom end thereof higher than said one bottom end, pneumatically operated sandblasting means for projecting sand particles against a surface to be sandblasted and including a sand reservoir of substantially smaller size than said receptacle and having reservoir inlet means for filling said reservoir with sand, said sandblasting means being positioned for flow of sand from said outlet means to said inlet means, said sandblasting means reservoir being connected by elongated flexible conduit means with manipulatable nozzle means for manipulation by a workman remote from said platform, carrier means mounted on said platform adjacent said rear platform end for raising and lowering movement relative to said platform, said carrier means including generally horizontal carrier support means spaced a substantial distance downwardly from said platform, said sandblasting means including said reservoir being releasably secured to and supported on said carrier support means in upstanding relationship thereto, and a wheeled self-contained engine driven air compressor means removably mounted on said platform remote from said sandblasting means between said receptacle and said platform front end for supplying air to said sandblasting means.

4,019,285

DEVICES FOR MOUNTING LENSES FOR EDGE GRINDING

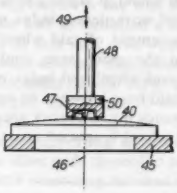
George William Gravell, London, England, assignor to Raphael's Limited, London, England

Continuation of Ser. No. 523,853, Nov. 14, 1974, abandoned. This application Mar. 19, 1976, Ser. No. 668,729

Claims priority, application United Kingdom, Nov. 28, 1973, 55189/73

Int. Cl.² B24B *41/06*

U.S. Cl. 51—216 LP **4 Claims**



1. A device for mounting a lens in an edge grinding machine, comprising: a key member adhesively secured to a surface of said lens in a centered and angularly oriented position, a pair of friction pad members adapted to engage said lens therebetween and to frictionally transmit rotational forces thereto; said key member comprising a lens surface conforming base and a key projecting from said base; and one of said pair of friction pad members having means defining a keyway which receives said key for aligning said one friction pad member in a centered and angularly oriented position relative to said lens, means defining a recess around said keyway which accommodates said base of said key member, and a surface surrounding said recess to engage said lens in frictional drive-transmitting relationship.

4,019,286

HONE FOR INVOLUTE KNIFE

Robert J. Spooner, and Oscar W. Dillon, both of Essex, Conn., assignors to Cashin Systems Corporation, Williston Park, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,230

Int. Cl.² B24B *3/40*

U.S. Cl. 51—248 **6 Claims**

1. A hone for sharpening the cutting edge of a rotary involute knife blade mounted on a shaft comprising:

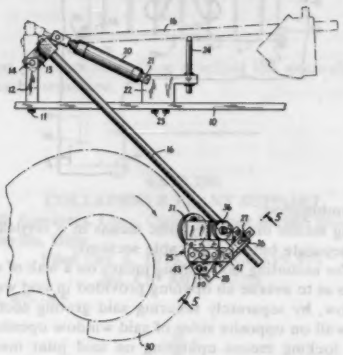
a hone arm pivotally connected at one end to a support in fixed position with respect to said shaft, the axis of the said pivot being parallel to the said shaft to permit the arm to rotate around the pivot in a plane parallel to the plane of the knife blade and through a tracking angle to compensate for changes in the radii of the cutting edge of the knife blade;

a grinding assembly affixed to the other end of the said hone arm by adjustable mounting means;

said grinding assembly comprising:

a. guide means contacting said blade adjacent the cutting edge;

b. a first grinding wheel mounted at an angle to the plane of the blade to be sharpened; and



c. means interconnecting the guide means and first grinding wheel to position said first grinding wheel with respect to said cutting edge;

said mounting means comprising adjustments to rotate the grinding assembly around the hone arm, to rotate the grinding assembly with respect to the mounting means to adjust the tracking angle, and to move the grinding assembly sideways with respect to the mounting means and the knife blade;

the pivot point of the said hone arm and the point of attachment of the grinding assembly to the said hone arm being so positioned that the first grinding wheel will make proper contact with the cutting edge at any radius of the blade and over the entire path of the cutting edge.

4,019,287

SPIRAL KNIFE SHARPENER

Lowell J. Goering, Moundridge, and Harold William Voth, Newton, both of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed June 12, 1975, Ser. No. 586,420

Int. Cl.² B24B *3/42*

U.S. Cl. 51—249 **9 Claims**

1. In combination with a crop cutting cylinder rotatable about its own longitudinal axis and having at least one elongated knife extending helically about said axis, said knife having a normally leading edge, an outer surface, and a bevel between said edge and said surface, a sharpener for said knife comprising:

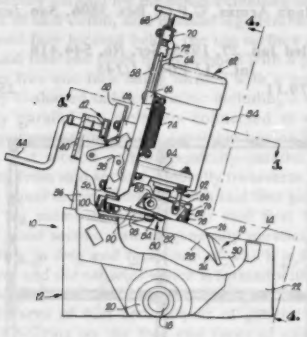
a grinding element;

means mounting said element for reciprocation along a path of travel parallel with said axis of the cylinder and in engagement with the bevel of said knife; and

a pair of opposed guides disposed for trapping said knife between the same when the element is reciprocated;

said guides being mounted for movement with said element whereby during said reciprocation of the latter the cylinder is rotated to the extent and in the direction necessary

to maintain the bevel of the knife engaged with the element,



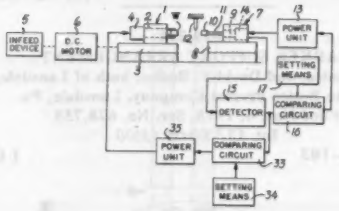
one of said guides being disposed for engagement with said leading edge of the knife and the other being disposed for engagement with said outer surface of the knife.

4,019,288

GRINDING METHOD AND APPARATUS

Sadao Moritomo, Ichikawa, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Japan

Filed May 9, 1975, Ser. No. 576,183
Claims priority, application Japan, May 10, 1974, 49-52082; May 16, 1974, 49-54916
Int. Cl.² B24B 49/00
U.S. Cl. 51—327 8 Claims



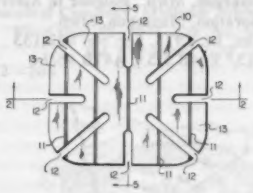
1. A grinding method with revolution speed control of a grinding wheel, comprising the steps of: moving a grinding wheel into pressure contact with a workpiece; rotating the grinding wheel at a revolution speed effective for feed grinding and at a value different from that corresponding to a first resonance frequency of the wheel spindle as determined when the grinding wheel is in pressure contact with the workpiece to thereby feed-grind the workpiece; detecting spark-out or finish of the feed grinding and providing a corresponding signal; and then lowering the revolution speed in response to said signal to another value different from that corresponding to a second resonance frequency of the wheel spindle as determined when the grinding wheel is in spark-out operation, this resonance frequency being lower than the first, to thereby surface-grind the workpiece; whereby good grinding quality is attained in the feed grinding operation and good surface finishing in the spark-out operation.

4,019,289

REPLACEABLE LENS SURFACING PAD WITH INTEGRAL WEAR INDICATING PATTERN

Clayton Paul Korver, 5739 Redwood Lane, Dallas, Tex. 75209

Filed Feb. 23, 1976, Ser. No. 660,339
Int. Cl.² B24D 11/02
U.S. Cl. 51—395 8 Claims



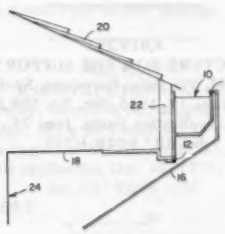
1. A lens surfacing device for use between a lens to be surfaced and a smooth curved surfacing tool, comprising a replaceable homogeneous metal pad of toolable material conformable to have substantially identical curvature and configuration as said tool and having a first face for movable contact in intimate association with an abrasive slurry with the lens to be surfaced, a second face separated from and located back-to-back with said first face for removable affixation to said surfacing tool, and wear indicating means comprising depressions defining intermediate face areas of lesser surface area than said first face and located below said first face a predetermined distance beyond which wear of said pad results in imperfections being created in said lens for indicating pad wear as said first face is eroded relative to said intermediate areas during a lens fining operation.

4,019,290

GUTTER PROTECTOR

Bruce R. Manty, Moose Lake, Minn., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Dec. 23, 1975, Ser. No. 643,787
Int. Cl.² E04D 13/00
U.S. Cl. 52—11 1 Claim



1. A rain gutter comprising a trough positionable adjacent to the edge of a roof that extends over a building to form an eave, said trough being adopted to collect water flowing over such edge of a roof, the back of said trough being mountable on a facia trim board extending downward from such edge of a roof, a hinge having one arm extending in a direction from a point below said trough upwardly and secured to the back of said trough, said hinge having a second arm extending in a direction under such eave and towards a wall of a building on which said roof is mounted, said hinge being adapted to pivot at the intersection of such facie trim board and such eave, said one arm of said hinge being of a sufficient length so that said trough may be folded under such eave and so that the front edge of said trough is pointing at least towards such wall, a rod pivotally secured to the front edge of said trough for holding said trough in a rain collecting position under such roof edge and against such facia trim board, said rod also being operable

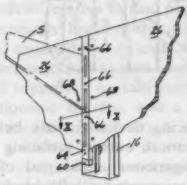
to swing and hold said trough under such eave, said rod extending downwardly from said front edge of said trough and then at an angle towards said hinge.

4,019,291

WALL SYSTEM

Gerhard Ernst, Muskegon, Mich., assignor to American Store Equipment Corporation, Muskegon, Mich.

Filed Oct. 14, 1975, Ser. No. 622,133
Int. Cl.² E04B 5/55; A47B 96/14
U.S. Cl. 52—36 14 Claims



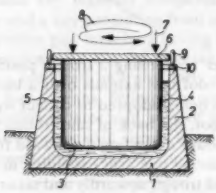
1. A prefabricated wall system comprising a wall frame section having at least a pair of spaced, vertical studs and top and bottom stringers for securing said studs in horizontally spaced positions; a covering material such as dry wall sheeting or the like secured to at least one side of said wall frame section; and generally concealed, slotted channel means for receiving cantilever-type supports for shelving or the like including an outwardly opening, elongated channel extending vertically along one of said studs at the side of one of said wall frame sections, the edges of said covering material abutting either side of said channel with the edges of said channel being generally flush with the surface of said covering material, and an inwardly opening, elongated, slotted channel received within said outwardly opening channel such that a series of aligned, vertical slots are exposed at the surface of said covering material; and means for securing said slotted channel within said outwardly opening channel and for securing said outwardly opening channel to said stud.

4,019,292

ROTARY STRUCTURE FOR THE SUPPORT OF LOADS

Enrique Pedro, 152, Via Julia, Barcelona, Spain

Filed June 19, 1975, Ser. No. 588,154
Claims priority, application Spain, June 25, 1974, 427899
Int. Cl.² E04B 1/346
U.S. Cl. 52—65 12 Claims



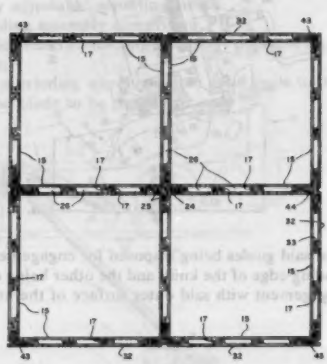
1. In combination: a fixed body having a peripheral portion, a hollow chamber, and central vertical axis, a liquid partially filling said chamber, a movable body floatingly received in the liquid in said chamber, and having a central vertical axis, and a rotary support structure for supporting loads to be rotated, said support structure including means supported on said peripheral portion for circular movement thereover about said central vertical axis.

4,019,293

BUILDING MODULES AND STRUCTURE EMBODYING SUCH MODULES

Eduardo Santana Armas, G.P.O. Box 3806, San Juan, P.R. 00936

Filed Jan. 27, 1975, Ser. No. 544,418
Int. Cl.² E04B 1/348
U.S. Cl. 52—79.11 25 Claims



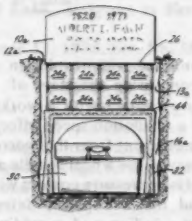
1. A building module comprising four upright side walls and a roof integrally cast of concrete, the roof having a planar top surface and the side walls being joined at corners and each having a series of equally spaced upright studs of greater thickness than the wall portions between the studs and projecting from the outer surfaces of the side walls, the stud at each end of the series on each of the four side walls being spaced from the end of that wall and the stud at one end of the series for each of the four side walls being spaced from the adjacent corner of the module a distance greater than the spacing of the stud at the other end of the series from the corner of the module adjacent said other end, thereby providing for interfitting of the studs of one side wall of the module with the studs of any side wall of a similar module when such side walls are congruently positioned with relation to each other.

4,019,294

MARKER SUPPORT ARRANGEMENT

Joseph F. Bosico, and David F. Bosico, both of Lansdale, Pa., assignors to Bosico Precast Company, Lansdale, Pa.

Filed Nov. 4, 1975, Ser. No. 628,758
Int. Cl.² E04H 13/00
U.S. Cl. 52—103 1 Claim



1. A combination comprising a coffin, an excavation in which said coffin is located, said excavation including a trench formed in the bottom of and at one end thereof, said trench having a length significantly less than that of said excavation, a lower generally U-shaped saddle member including a first pair of generally parallel leg members connected at one end by a generally transverse leg member, said lower saddle mem-

ber being located in said excavation with said transverse leg member being in said trench and below said coffin and with said generally parallel leg members extending upwardly along the sides of said coffin, said parallel leg members terminating in free end face located below the top surface of said coffin, one of said free end faces being formed with a projection and the other free end face being formed with a notch, an upper generally U-shaped saddle member including a second pair of generally parallel leg members connected at one end by a second generally transverse leg member having a generally flat surface, said second pair of generally parallel leg members extending from said second generally transverse leg member a distance equal to the distance which said first generally pair of parallel leg members extend from said first transverse leg member, said second pair of generally parallel leg members terminating in free end faces one of which is formed with a projection and the other of which is formed with a notch, said upper saddle member being located in excavation with the free end faces of said second pair of generally parallel leg members bearing on the free end faces of said first pair of generally parallel leg members with the said projection in one pair seating in said notch in the other pair and with said generally flat surface being located closely adjacent the top surface of said coffin and below the ground surface around said excavation, and support means on said generally flat surface extending upwardly therefrom and terminating in a support base generally level with the ground surface around said excavation for supporting a marker, said support means comprising a plurality of blocks placed on top of each other.

4,019,295

LIGHT TRANSMITTING PANEL WITH SOUND DAMPING PROPERTIES

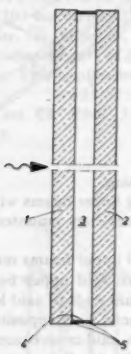
Paul Derner, Gelsenkirchen; Hans Sonntag, Gelsenkirchen-Buer, and Otto Stehl, Essen, all of Germany, assignors to BFG Glassgroup, Paris, France

Filed Sept. 16, 1975, Ser. No. 613,853

Claims priority, application Luxembourg, Apr. 4, 1975, 72200; Sept. 16, 1974, 70915; Sept. 16, 1974, 70916; Germany, Dec. 27, 1974, 2461533; Dec. 27, 1974, 2461531; Dec. 27, 1974, 2461532; Feb. 1, 1975, 2504293

Int. Cl.² E06B *5/20*; B32B *1/04*

U.S. Cl. 52—171 **38 Claims**



1. In a light transmitting panel composed of at least two panes, and spacer means holding the panes in spaced relation to define at least one inter-pane space therebetween, the improvement wherein, for improving the sound damping properties of said panel, said inter-pane space is more than 9mm thick and is sealed from the atmosphere, and said panel further comprises a gaseous medium at least 30% by volume of which has the composition of air, the medium further including a quantity of at least one other gas, and the composition of said medium being such that the velocity of sound propagation in said gaseous medium at a given temperature and pressure differs from that in dry air at the same pressure and temperature by a least 5%.

4,019,296

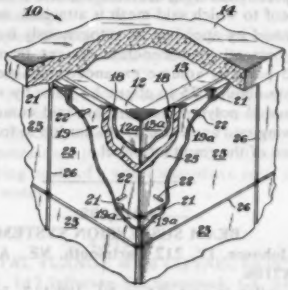
FACADE CLAD BUILDINGS AND METHOD

Ludwig V. Jochmann, Wadenswil, Switzerland, assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 12, 1975, Ser. No. 640,130

Int. Cl.² E04B *2/28*

U.S. Cl. 52—268 **9 Claims**



1. A building structure, the building structure having a wall and a roof, the wall and roof enclosing a useful space therein, the wall having an exterior surface, the exterior surface having a generally water-impermeable layer affixed thereto, the water-impermeable layer being generally coextensive with the outer surface of the wall, a layer of thermal insulation disposed on the water-impermeable layer and affixed thereto, the layer of thermal insulation comprising a closed-cell, generally water-impermeable foam, a plurality of facade cladding panels disposed remote from the water-impermeable layer and generally adjacent the closed-cell foam thermally insulating layer and means to suspend the panels in generally spaced parallel relationship to an adjacent surface of the foam insulating layer, and at least a majority of the panels defining between adjacent edges a water-permeable passage.

4,019,297

CONSTRUCTION PANEL

William F. Murphy, Marshall, Ill., assignor to David V. Munnis, Champaign, Ill., a part interest

Continuation-in-part of Ser. No. 491,283, July 29, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,793

Int. Cl.² E04B *1/26*

U.S. Cl. 52—309.2 **5 Claims**

1. A separately transportable, masonry-faced construction panel comprising (1) a frame, wherein said frame is comprised of a plurality of parallel, spaced apart vertical studs, a transverse top plate across the upper ends of said studs, and a transverse bottom plate across the bottom ends of said studs,

said studs and plates being secured together and positioned relative to each other such that the respective adjacent side and back faces thereof are flush with each other and such that the front faces of said plates extend forwardly farther than do the front faces of said studs, said plates having a depth dimension which is greater than that of said studs, (2) an insulating fiber board panel secured to and covering the front faces of said studs within the resultant cavity formed between said plates, (3) a mesh of filament covering the faces of said fiber board opposite said studs and the front faces of said plates of said frame adjacent said fiber board, and (4) an in situ formed crack-free concrete-like facing layer on said fiber board, said facing layer containing said filament mesh imbedded therein and completely covering the front surface of said frame on the side thereof to which said mesh is attached, said facing layer being formed by applying an autogenously hardenable paste consisting essentially of concrete cement, from about 0.75 to about 2.5 parts by volume expanded mica per part said cement, from about 0.75 to about 2.5 parts by volume particulate expanded polystyrene per part said cement, and water, and allowing said applied paste to harden to form thereby one entire face of the resultant panel.

4,019,298

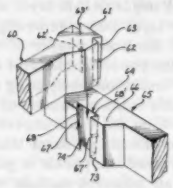
BEAM SUSPENSION SYSTEM

John J. Johnson, IV, 212 Dartmouth, NE., Albuquerque, N. Mex. 87106

Continuation-in-part of Ser. No. 380,147, July 18, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,478

Int. Cl.² E04C *1/10*; **E04B** *1/56*; **F16B** *12/58*

U.S. Cl. 52—594 **2 Claims**



1. A beam suspension structure securing a beam to a joint in a building structure, said suspension structure comprising in combination:

a. a dual tapered dovetail mortise disposed within a planar side of the joist and extending downwardly from the top of the joist, said mortise including:

i. an end surface depending downwardly from the top of the joist and sloping forwardly toward said side of the joist, said end surface being laterally terminated by lateral edges sloping downwardly toward one another at an acute angle and defining the sides of an inverted truncated isosceles triangle;

ii. a pair of opposed lateral surfaces sloping downwardly toward one another and extending horizontally from said lateral edges of said end surface toward said side of the joist and toward one another, each said lateral surface being laterally terminated by a further lateral edge, said further lateral edges being sloped downwardly and toward one another at an acute angle within the plane of said side of the joist such that each said lateral surface defines an inverted truncated right triangle whereby a cross-section of said mortise defined by said end surface and said lateral surfaces and taken parallel to the top surface of the joist defines a trapezoid and resulting in said mortise being linearly tapered in both width and depth; and

b. a dual tapered dovetail tenon extending from a planar end of the beam, said tenon including:

i. a further end surface at the extremity of said tenon sloping downwardly and inwardly toward the beam at an angle equivalent to the sloping angle of said end surface of said mortise, said further end surface being laterally terminated by yet further lateral edges sloping downwardly toward one another at an acute angle and defining the sides of an inverted truncated isosceles triangle; and

ii. a pair of further lateral surfaces sloping downwardly toward one another and extending horizontally from said further lateral edges of said further end surface toward said end of the beam and toward one another, each said further lateral surface being laterally terminated by still further lateral edges, said still further lateral edges being disposed in the plane of said end of the beam and sloping downwardly and toward one another at an acute angle such that each said further lateral surfaces defines an inverted truncated right triangle, whereby a cross-section of said tenon defined by said further end surface and said further pair of lateral surfaces and taken parallel to the longitudinal axis of the beam defines a trapezoid and resulting in said tenon being linearly tapered in both width and depth:

c. said tenon being mated with said mortise each of the surfaces defining said mortise interferingly contact corresponding surfaces of said tenon to establish force vectors perpendicular to each of the pairs of contacting surfaces to draw and retain said planar end of the beam adjacent said planar side of the joist and frictionally interlock said planar side of the joist and frictionally interlock said mortise and said tenon.

4,019,299

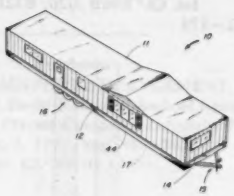
FLOOR FRAME ASSEMBLY FOR A MOBILE BUILDING

Frederick H. Lindsay, Rte. 1, Box 71, Darwin, Minn. 55324

Division of Ser. No. 560,792, March 21, 1975. This application Apr. 2, 1976, Ser. No. 673,208

Int. Cl.² B62D *21/00*; **B60P** *3/32*

U.S. Cl. 52—648 **2 Claims**



1. A floor joist comprising:

a plurality of horizontal lower beams with opposite ends;

a pluraity of vertical members mounted to and atop said lower beams;

a plurality of horizontal upper beams mounted to and atop said vertical members, said upper beams have ends located outwardly of said ends of said lower beams;

a plurality of cross braces with opposite ends attached to said vertical members, said cross braces being attached to said lower beams and extending upwardly and outwardly toward sad ends of said upper beams being attached to said upper beams;

a pair of floor runners extending perpendicular to said lower beams and being in contact with said ends of said lower beams, vertical supports extending down from said ends of said upper beams and resting atop said floor runners;

end walls extending between said upper beams and said lower beams; and,

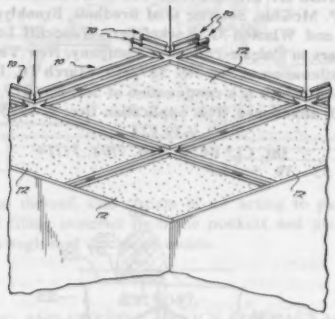
a floor mounted atop and to said upper beams providing a support surface for receiving stacked items thereatop.

4,019,300

SUSPENDED CEILING STRUCTURE

Gale E. Sauer, Williamsville, and Barton Hansen, Cheektowaga, both of N.Y., assignors to Roblin Industries, Inc., Buffalo, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,726
Int. Cl.² E04B *5/52*
U.S. Cl. 52—665 **21 Claims**



9. A grid system adapted to support a plurality of individual panel members in a plane and being in combination with an air handling conduit between said panel members, said grid system comprising:

at least one pair of spaced grid members being substantially parallel to one another,

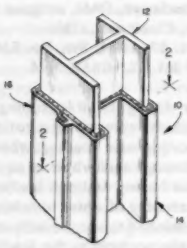
at least one bridging clip means, said bridging clip means being assembled to said pair of grid members to maintain the latter in a substantially parallel, spaced disposition with respect to one another so that said pair of grid members are adapted to support panel members on the non-adjacent sides thereof and air handling conduits between the adjacent sides thereof at preselected locations along the longitudinal length thereof.

4,019,301

CORROSION-RESISTANT ENCASEMENT FOR STRUCTURAL MEMBERS

Douglas L. Fox, 3203 Northridge Drive, Pikesville, Md. 21208

Continuation of Ser. No. 488,539, July 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 338,350, March 5, 1973, abandoned. This application Oct. 24, 1975, Ser. No. 625,871
Int. Cl.² E04C *3/34, 3/30*
U.S. Cl. 52—725 **12 Claims**



1. A light-weight in situ-formed protective encasement for a structural member situated at least partially in water, and supporting a transverse load,

said encasement member comprising a sheet-like jacket of reinforced resin material which is chemically inert and corrosion resistant sized to receive at least a portion of said structural member therein with at least the lower end of said encasement member located beneath the water level,

said jacket having at least two separated and confronting longitudinal wall edges, and having a cross-sectional area appreciably larger than the cross sectional area of said structural member to define a continuous gap between said jacket and said structural member,

said sheet-like jacket being sufficiently flexible to enable separation of said jacket at said longitudinal edge walls by a distance greater than the width of said structural member whereby to permit said jacket to be inserted transversely about said structural member in a mounted position in which said longitudinal edge walls are in overlapping relationship,

said overlapping edge walls of said jacket in said mounted position being joined in situ by a sealing agent capable of curing in water,

and a filler of inert bonding material filling said gap and bonding said jacket to said structural member, thereby forming with said jacket a rigid unitary encasement member as a permanent part of said structural member,

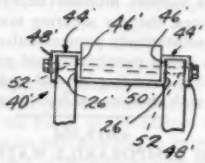
said filler being made of a water insensitive resin capable of curing in water.

4,019,302

METAL FLANGE WEB CONNECTION

Leon J. Meyer, 142 Jefferson St., Savannah, Ga. 31401

Filed Apr. 3, 1973, Ser. No. 347,362
Int. Cl.² E04C *3/32, 3/07*
U.S. Cl. 52—730 **2 Claims**



1. A metal connector member for use in constructing a plywood box beam or double walled plywood panel comprising an elongated metal member including two coextensive, spaced-apart parallel channel portions facing in the same direction and extending the length of said member, each of said channel portions defining a slot having parallel walls for engaging and clamping to the opposite faces of an edge portion of a plywood sheet, said walls having a large number of sharp projections extending inwardly for penetration into the plywood to thereby form a friction bond with both faces of the plywood along the length of said channel portion, the adjacent walls of the channel portions also defining a third channel portion which is parallel to and faces in a direction opposite the first two channel portions.

4,019,303

ADJUSTABLE SPLIT DOOR JAMB

Owen Earl McAllister, Oshkosh, Wis., assignor to Combustion Engineering, Inc., Windsor, Conn.

Division of Ser. No. 462,475, April 19, 1974, Pat. No. 3,981,103. This application Nov. 19, 1975, Ser. No. 633,194
Int. Cl.² E04C *2/00;* **E06B** *1/04*
U.S. Cl. 52—745 **3 Claims**

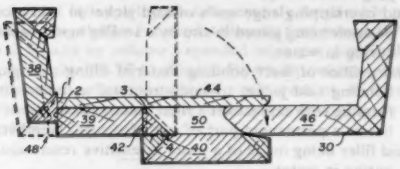
1. The process of manufacturing an adjustable split door frame member, the process comprising the steps of:

a. cladding the front surface of a board with a flexible cladding material;

b. longitudinally grooving four parallel V-shaped grooves in the back of said board down to but not through said clad, each groove defining two adjacent surfaces respectively;

c. grooving down to but not through said clad a first and a second plowed groove in the back of said board parallel to and between the middle two V-shaped grooves, said first plowed groove defining first and second facing surfaces and said second plowed groove defining third and fourth facing surfaces, and said first and second plowed grooves forming a middle portion therebetween;

d. joining said board along said V-shaped grooves by folding said respective adjacent surfaces toward each other into abutting relationship and securing said board in said relationship, thereby forming first and second folded ends of said board adjacent to and outside of said first and second plowed grooves respectively;



e. joining said first and second facing surfaces together in abutting relationship along a portion thereof by moving said second surface toward said first surface, offsetting said second surface by an amount equal to the width of said first plowed groove, and securing said surfaces in said offset abutting relationship;

f. rotating said third surface away from said fourth surface by an angle of substantially 90°;

g. attaching a support member between said third and fourth surfaces, thereby securing said third and fourth surfaces in substantially perpendicular positions;

h. attaching a board member to said middle portion, said board member extending beyond said middle portion to form a slot with said second folded end.

4,019,304

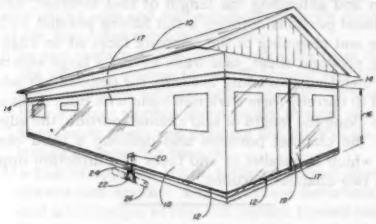
METHOD OF TEMPORARILY WATER-PROOFING PARTS OF BUILDINGS IN ANTICIPATION OF FLOODS

Rolando E. Timm, 628 Aldee Lane, Gretna, La. 70053

Filed Oct. 29, 1975, Ser. No. 626,699

Int. Cl.² E04H *9/14*

U.S. Cl. 52—746 **3 Claims**



1. Method of temporarily waterproofing parts of a building in anticipation of floods comprising the steps of:

a. Sealing a continuous strip of waterproof tape around bottom of building, said tape having both sides coated with sealing, and sealing to said building by means of one coated side;

b. sealing a similar tape exteriorly around said building spaced vertically upward from said first tape more than the expected height of flooding;

c. inserting blodders in junctions of drains opening interiorly between said tapes;

d. covering with plywood all exterior openings in in and below said building; and

e. wrapping a continuous sheet of flexible plastic around said building that extends between said tapes and seals thereto by the irrespective second sides; and

f. sealing the ends of said continuous sheet with waterproof sealing means.

4,019,305

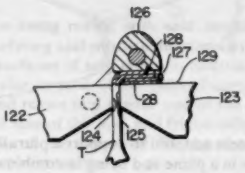
METHODS AND APPARATUS FOR FOLDABLY CLOSING THE ENDS OF LAMINATED METAL-PLASTIC TUBES

Russell P. McGhie, Somers; Olaf Bredholt, Brooklyn, both of N.Y., and Winston G. Rockefeller, Woodcliff Lake, N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 557,059, March 10, 1975, abandoned, which is a continuation of Ser. No. 379,911, July 16, 1973, abandoned. This application Dec. 9, 1975, Ser. No. 639,124

Int. Cl.² B65B *7/14, 7/08, 51/14*

U.S. Cl. 53—39 **2 Claims**



1. A method of foldably closing the end of a flexible dispensing tube having a metal-plastic laminate wall comprising a layer of a metal that will retain a dead fold shape and a coextensive external bonded layer of a heat softenable synthetic plastic on at least one side of said metal layer, said plastic being of a material which has an inherent memory characteristic tending during cooling to open a fold imparted thereto when heated, comprising flattening and folding an end section of the laminated tube wall while subjecting said section to controlled heat for a predetermined period and at a predetermined temperature appreciably above ambient temperature and within a range the lower limit of which is such that the plastic is softened and conditioned to permit a dead fold in the metal layer to be accomplished and said applied heat being such as to destroy said memory whereby a dead fold at the tube end is maintained by the folded metal layer even when said end section cools to ambient temperature, and the upper limit of which is such that the plastic is not undesirably softened or damaged.

4,019,306

APPARATUS FOR FORMING TAMPON SACKS AND FILLING SAME WITH AGGREGATE

Stephen F. Evans, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

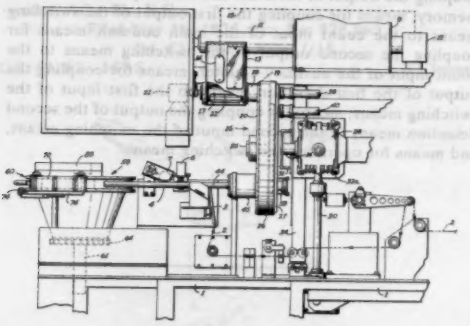
Filed Dec. 27, 1974, Ser. No. 536,832

Int. Cl.² B65B *1/26*

U.S. Cl. 53—124 A **31 Claims**

1. Apparatus for filling flexible tubing with measured charges of filling material comprising a rotary loading wheel, drive means for rotating said loading wheel, a plurality of pockets extending through said wheel at equally spaced apart intervals, each pocket having an open leading end and a trailing end closed by screening of a size to retain the filling material, a filling port positioned to sequentially communicate with the leading ends of the pockets as the loading wheel rotates, means for continuously feeding filling material to said filling port, means for drawing vacuum on said pockets from the trailing ends thereof when their leading ends are in communication with said filling port, a discharge nozzle having a leading end and a trailing end, the trailing end of said discharge nozzle being positioned to sequentially communicate with the leading ends of the pockets subsequent to their passage be-

yond said filling port, and means for passing a stream of air under pressure through said nozzle for discharge through the



leading end thereof, said stream of air acting to purge the charges of filling material from the pockets and propel the charges through said discharge nozzle.

4,019,307

WELDING AND CUTTING DEVICE FOR PACKAGING MACHINES

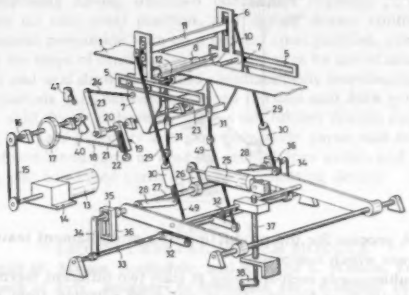
Aris Ballestrazzi; Lamberto Tassi, and Gianni Tosarelli, all of Vignola (Modena), Italy, assignors to Situno Holding SA, Luxembourg, Luxembourg

Filed Jan. 16, 1976, Ser. No. 649,578

Claims priority, application Italy, Jan. 17, 1975, 19387/75

Int. Cl.² B65B *51/14*

U.S. Cl. 53—182 R **3 Claims**



1. A device for welding and severing for packaging machines of the kind in which the products to be packaged are arranged in succession on a conveyor belt and wrapped by a continuous tubular film of a plastics material, comprising a carriage which is moved with a horizontal reciprocation in the direction of movement of the conveyor belt, a welding rod and a counter-welding rod carried by said carriage on opposite sides with respect to said tubular film and capable of approaching to each other to provide a temporary condition of engagement for welding and severing of the film inserted therebetween first actuation means adapted to impress on the counterwelding rod a reciprocal vertical motion between an at rest position immediately below the tubular film and a variable lifted position and second actuating means adapted to impress on the welding rod a vertical reciprocation of constant amplitude between a lifted at rest position and a depressed position of mutual engagement for welding and severing with said counter-welding rod when the latter is in the lifted position, whereby the vertical position of mutual engagement is adjustable, said first and second actuating means comprising respective control shafts having a rotary reciprocal motion and so coupled to each other that a rotary reciprocation of constant amplitude impressed on the control shaft of the welding rod produces a rotary reciprocation of the control shaft of the counter-welding rod having an amplitude which is varied as the distance between the axes of the shafts is varied, and means for temporarily deflecting the conveyor belt in correspondence with said carriage so that the belt does not pass through the gap between said welding and counter-welding rods.

4,019,308

BASE CUTTING APPARATUS FOR SUGAR CANE HARVESTERS

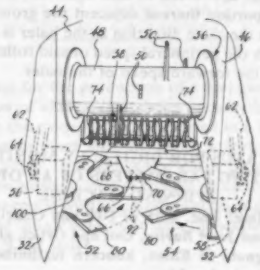
Donald J. Quick, Bundaberg, Australia, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Oct. 10, 1975, Ser. No. 621,275

Claims priority, application United Kingdom, Dec. 27, 1974, 55890/74

Int. Cl.² A01D *55/26, 45/02, 45/10*

U.S. Cl. 56—13.9 **1 Claim**



1. A sugar cane harvester including a main frame, a pair of spaced rotatable crop lifting augers mounted on the forward portion of the frame, a pair of spaced substantially parallel walls mounted on the frame to the rear of the crop lifting augers to define a main feed passage, an improved cane base cutter mounted on each of the parallel walls for severing cane at the surface of the ground or below, a butt lifter and feed rollers rotatably mounted between the parallel walls for conveying cane up and to the rear, a cane chopping apparatus mounted on the main frame for receiving cane from the butt lifter and feed rollers and chopping the cane into billets, and billet cleaning and conveying means mounted on the frame for conveying billets away from the cane chopping apparatus and for separating trash from the billets, wherein said improved base cutters each include a gear box mounted on one of said parallel side walls, a drive shaft extending generally downward from the gear box, a generally flat central blade support member supported and driven by said drive shaft, a plurality of integral generally flat blade support arms extending outwardly from and forming an integral part of the central blade support member and a generally flat blade attached to the bottom of each of the blade support arms and extending outwardly therefrom.

4,019,309

ROUND BALE FORMING MACHINE

Vernon J. Lundell, P.O. Box 171, Cherokee, Iowa 51012

Filed Mar. 5, 1976, Ser. No. 664,344

Int. Cl.² A01D *39/00*

U.S. Cl. 56—341 **9 Claims**

1. A round bale forming machine for picking up cut hay from a field and forming it into a cylindrical bale, said baler comprising:

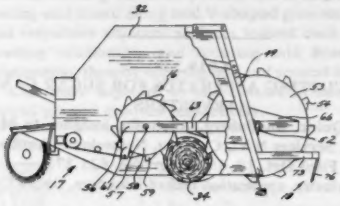
portable frame means having a forward end and a rearward end;

upright spaced side walls mounted on said frame;

drum means rotatably mounted on said frame means be-

tween said side walls proximate said rearward end, said drum means having pickup means mounted on the periphery thereof for picking up the hay and for rolling the hay into a cylindrical bale and for forming the bale;

roller means disposed forwardly of and parallel to said drum means and rotatably and movably mounted between said



side walls for compacting, forming and rolling the bale; and

power means connected to said drum to rotate same such that the portion thereof adjacent the ground moves forwardly in the same direction as the baler is moving of the baler with the peripheral speed of said roller substantially equal to the forward speed of the baler.

4,019,310

APPARATUS FOR DIGITALLY MONITORING OPERATING PARAMETERS OF AN OPEN-END SPINNING MACHINE

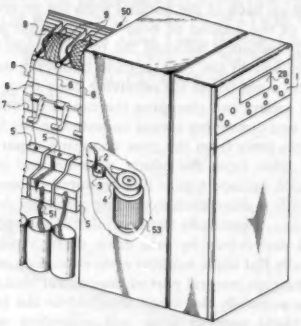
Pavel Seidl; Josef Rod, both of Usti nad Orlici; Jiří Deutsch, Vrchlabi, and Josef Bartos, Usti nad Orlici, all of Czechoslovakia, assignors to Elitex, koncern textilniho strojirenstvi, Liberec, Czechoslovakia

Filed Apr. 12, 1976, Ser. No. 675,947

Claims priority, application Czechoslovakia, Apr. 15, 1975, 2581/75

Int. Cl.² D01H *13/32, 1/12*

U.S. Cl. 57—34 R **10 Claims**



1. Apparatus for digitally mointoring selected operating parameters of an open-end spinning machine, the machine including a rotary combing cylinder for separating slivers supplied thereto into fibers, means for feeding slivers into the combing cylinder, a rotary spinning chamber coupled to the output of the combing cylinder for spinning separated fibers into yarn, and means for withdrawing spun fibers from the spinning chamber, the apparatus comprising, in combination, first detection means coupled to the spun fiber withdrawing means for generating a first sequence of pulses at a rate proportional to the rate of withdrawal of the spun fibers, second detection means coupled to the sliver-introducing means for generating a second sequence of pulses at a rate proportional to the rate of introduction of the slivers, multi-tap sequentially operable switching means having at least first and second inputs and first and second outputs, a main binary counter, an auxiliary binary counter, a memory, means for selectively coupling the output of the main and auxiliary counters to the memory, means for coupling the first output of the switching means to the count input of the main counter, means for coupling the second output of the switching means to the count input of the auxiliary counter, means for coupling the output of the first detection means to the first input of the switching means, means for coupling the output of the second detection means to the second input of the switching means, and means for operating the switching means.

4,019,311

PROCESS FOR THE PRODUCTION OF A MULTIFILAMENT TEXTURIZED YARN

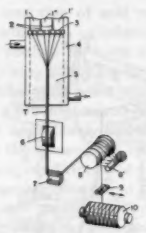
Heinz Schippers, Remscheid, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengeselischaft, Wuppertal, Germany

Filed July 16, 1974, Ser. No. 488,948

Claims priority, application Germany, July 18, 1973, 2336509

Int. Cl.² D02G *3/04;* D01D *5/12*

U.S. Cl. 57—140 BY **14 Claims**



1. A process for the production of a multifilament texturized yarn which comprises:

simultaneously melt-spinning at least two different thermoplastic fiber-forming linear polymers selected from the group consisting of linear fiber-forming and crimpable polyesters and polyamides into a continuous preoriented multifilament tow containing the different polymer components under substantially the same spinning conditions for all portions as the tow including a draw-off from the spinning zone at a velocity of more than 2,500 meters/minute;

and then, in a second separate stage prior to any crimping, stretching the spun and solidified multifilament tow under substantially the same stretching conditions for all portions of the tow,

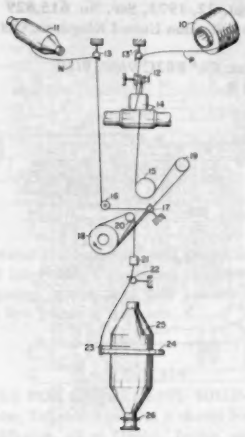
said melt-spinning being carried out to achieve a preorientation which is so high that the available maximum stretching ratio of all the filamentary polymer components in the second stage amounts to not more than 1:2.5, and said stretching being carried out to exceed the elastic limit of at least one of the filamentary polymer components with the proviso that said stretching is maintained above the elastic limit but below the maximum stretching ratio of at least one of the filamentary polymer components while said stretching also extends beyond the maximum stretching ratio of at least another one of the filamentary polymer components to cause filament breakage.

4,019,312

METHOD OF COMBINING SYNTHETIC YARNS

Ford E. Warrick, Asheville, N.C., assignor to Akzona Incorporated, Asheville, N.C.

Filed May 16, 1975, Ser. No. 578,065
Int. Cl.² D02G 3/04, 1/18
U.S. Cl. 57—157 S 6 Claims



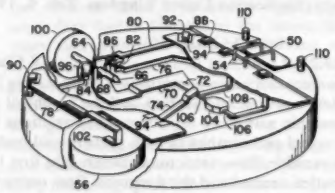
5. A method of combining undrawn polyester and drawn polyamide continuous filament yarns on a drawtwister having two creels provided for each drawing position and having means including a feed roll and a draw godet for drawing yarn, comprising having undrawn continuous filament polyester yarn on one creel position, and having drawn continuous filament polyamide yarn on a second creel position, comprising the steps of drawing said polyester yarn by use of said feed roll and said draw godet, and simultaneously introducing said polyamide yarn between said feed roll and said draw godet so the said drawn polyamide yarn is not further drawn; combining the said polyester and said polyamide yarns, and leading said combined yarns around the second draw godet; and winding said combined yarns on a yarn collecting device.

4,019,313

LIQUID CRYSTAL WATCH MODULE

Daniel W. Mason, Scottsdale, and Richard S. Walton, Tempe, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 17, 1975, Ser. No. 623,537
Int. Cl.² G04B 19/30; G04C 3/00
U.S. Cl. 58—23 R 9 Claims



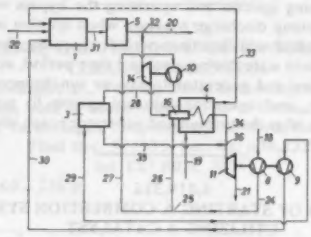
1. In an electronic timepiece, a display element having a given number of digit positions, first circuits for causing said display element to show hours and minutes in the given number of digit positions, second circuits for causing said display element to show minutes and seconds in the given number of digit positions, and a switch operable selectively to connect said first or second circuits to said display element.

4,019,314

HIGH PRESSURE GASIFICATION OF COAL USING NITROGEN DILUTION OF WASTE GAS FROM STEAM GENERATOR

Helmut Springmann, Geretsried, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Jan. 27, 1976, Ser. No. 652,772
Claims priority, application Germany, Jan. 27, 1975, 2503193
Int. Cl.² F02C 3/22
U.S. Cl. 60—39.02 12 Claims



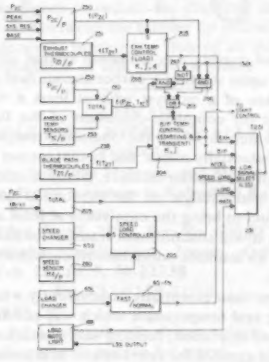
1. In a process for the production of a fuel gas by the pressure gasification of carbon-containing fuels with oxygen and steam, wherein the oxygen is manufactured in a low temperature air separation plant and the steam is formed in a gas-heated steam boiler, and the waste gases produced in the steam boiler are subsequently expanded in an expansion turbine, the improvement which comprises admixing the nitrogen produced during the air separation with the waste gases before the expansion of the latter.

4,019,315

GAS TURBINE POWER PLANT CONTROL APPARATUS INCLUDING A TEMPERATURE RESET STARTING CONTROL SYSTEM AND AN IGNITION PRESSURE CONTROL SYSTEM

Robert A. Yannone, Aldan, and James J. Shields, Philadelphia, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 20, 1973, Ser. No. 371,623
Int. Cl.² F02C 9/10
U.S. Cl. 60—39.03 58 Claims



53. A method for operating a gas turbine electric power plant having a gas turbine supplied with fuel by a fuel system

comprising a pump and a throttle valve in a main fuel flow path, means for regulating pump discharge pressure, and a bypass fuel flow path having means for determining bypass flow through the bypass flow path, the steps of said method comprising starting and driving the turbine and a mechanically coupled electric generator to ignition speed, operating the fuel system to ignite the turbine during an ignition period, operating the discharge pressure regulating means to provide primary control over the pump discharge pressure during predetermined turbine operating time periods, operating the bypass means to limit the pump discharge pressure at a given level within a first predetermined time period following initiation of ignition, sensing ignition and operating the bypass means to reduce said pump discharge pressure when ignition is sensed before the end of said first time period, operating the bypass means in a fixed state during a second time period, accelerating the turbine and generator to idle or synchronous speed after ignition, and operating the fuel system to meet load requirements after the turbine and generator reach idle speed.

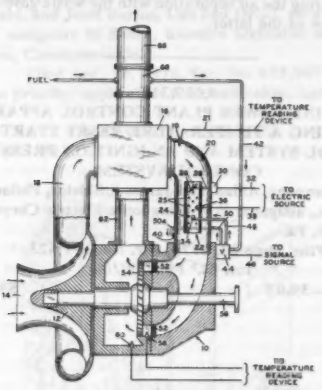
4,019,316
METHOD OF STARTING A COMBUSTION SYSTEM UTILIZING A CATALYST

William C. Pfefferle, Middletown, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Continuation-in-part of Ser. Nos. 142,939, May 13, 1971, abandoned, and Ser. No. 164,718, July 21, 1971, abandoned, and Ser. No. 358,411, May 8, 1973, Pat. No. 3,928,961. This application Dec. 29, 1975, Ser. No. 644,873

Int. Cl.² F02C 3/04; F02M 27/02

U.S. Cl. 60—39.02 **22 Claims**



1. A method starting a combustion system utilizing a catalyst in which upon starting a carbonaceous fuel is combusted in the presence of a catalyst with at least a stoichiometric amount of air for complete oxidation of the fuel to carbon dioxide and water, in which the operating temperature of the catalyst is substantially above the instantaneous auto-ignition temperature of the fuel-air mixture, which method comprises:

a. heating said catalyst in the substantial absence of unburned fuel to bring the catalyst to at least a temperature at which it will sustain mass transfer limited operation;

b. forming an intimate admixture of carbonaceous fuel and air; and

c. no sooner than essentially concurrently with the catalyst reaching said temperature which will sustain mass transfer limited operation, feeding said admixture of fuel and air to said catalyst for combustion, said combustion being characterized by said fuel-air admixture having an adiabatic flame temperature such that upon contact with said catalyst, the operating temperature of said catalyst is substantially above the instantaneous auto-ignition temperature of said fuel-air admixture but below a temperature that would result in any substantial formation of oxides of nitrogen.

4,019,317
FLUID FLOW CONTROL VALVE FOR GAS TURBINE ENGINE FUEL CONTROL SYSTEM

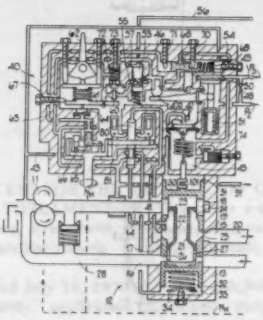
Trevor Stanley Smith, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Sept. 22, 1975, Ser. No. 615,829

Claims priority, application United Kingdom, Oct. 23, 1974, 45918/74

Int. Cl.² F02C 9/08, 9/10

U.S. Cl. 60—39.28 R **9 Claims**



1. A fluid flow control valve for a gas turbine engine fuel control system, comprising a body having an inlet and first and second outlets, first and second control elements which are slidable relative to each other and to said body, one of said elements being slidable within the other of said elements, said first control element defining, in part, a variable metering orifice and said first and second control elements co-operating to define a throttle valve, said metering orifice and said throttle valve being in series between said inlet and said first outlet, said first and second control elements also co-operating to define a spill valve between said inlet and said second outlet, movement of said second control element to increase flow through said first outlet simultaneously acting to decrease flow through said second outlet, means responsive to a first servo pressure signal for slidably moving said first control element, and means responsive to variations in a second servo pressure signal for slidably moving said second control element.

4,019,318
FLUID FLOW CONTROL VALVES

Trevor Stanley Smith, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Jan. 16, 1976, Ser. No. 649,617

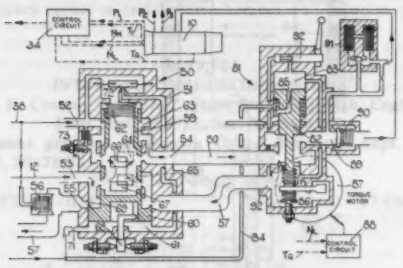
Claims priority, application United Kingdom, Feb. 5, 1975, 4830/75

Int. Cl.² F02C 9/08

U.S. Cl. 60—39.28 R **8 Claims**

1. A fluid flow control valve comprising a body having first and second inlets and first and second outlets, a control element movable within said body in response to variations in a servo pressure signal and combining with ports in said body to provide a first variable flow restrictor between said first inlet and said first outlet, second and third variable flow restrictors in series between said second inlet and said first outlet, and a fourth variable flow restrictor between said second inlet and said second outlet, and a pilot valve, responsive to a difference between the pressure at said first inlet and the pressure intermediate said second and third restrictors, for varying said servo pressure signal, an increase in the pressure at said first inlet resulting in an increase in flow through said first, second and third restrictors and a simultaneous decrease in flow through said fourth restrictor.

7. A fuel control system for a gas turbine engine, comprising a pump a control valve as claimed in claim 1, through said first outlet of which fuel can flow to the engine, a variable metering device responsive to engine operating parameters and con-



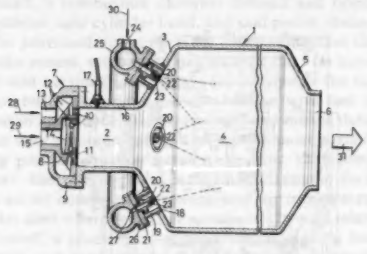
nected between the outlet of said pump and said first inlet, said second inlet being connected to receive unmetered fuel from said pump outlet, and said second outlet being connected to a low pressure zone.

4,019,319

APPARATUS FOR GENERATING HIGH-PRESSURE GAS

Noriyuki Oda; Takashi Yoshida; Takeshi Nakanishi, and Kensuke Yoshikawa, all of Osaka, Japan, assignors to Hitachi Shipbuilding and Engineering Co., Ltd., Osaka, Japan

Filed Aug. 14, 1975, Ser. No. 604,751
Claims priority, application Japan, Oct. 7, 1974, 49-115795
Int. Cl.² F02C 3/20
U.S. Cl. 60—39.46 S 8 Claims



1. An apparatus for generating a high temperature and high-pressure combustion gas from a three component propellant for use as a driving energy for turbines, comprising:

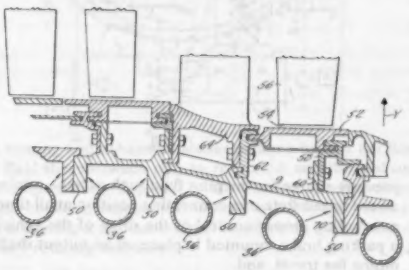
a primary oxidizing agent, a primary fuel and a secondary fuel, and in which a secondary oxidizing agent for the secondary fuel is formed by the interaction of said primary fuel with said primary oxidizing agent and said secondary fuel is a metal fuel, said apparatus including a gas generator body provided with a combustion chamber, said combustion chamber including a chamber portion, said gas generator body including a primary propellant injector having orifices for injecting the primary fuel into said chamber portion, and orifices for injecting the primary oxidizing agent into said chamber portion, for assuring that both said primary fuel and said primary oxidizing agent are thoroughly mixed together, both said orifices being open to the chamber portion of said combustion chamber, an igniter in communication with said chamber portion, for igniting the primary fuel forced out from said injector and thereby igniting the mixture of said primary fuel with said primary oxidizing agent which react with each other to produce in said chamber portion a high temperature combustion gas containing said secondary oxidizing agent, said secondary oxidizing agent being formed exclusively from products of the combustion of said primary fuel with said primary oxidizing agent, and valve means having a secondary fuel injecting orifice communicating with said combustion chamber for injecting a metal fuel into said combustion chamber, said metal fuel combining with said high temperature gas containing said secondary oxidizing agent formed in said chamber portion for reaction with said secondary oxidizing agent for producing the high-temperature and high-pressure combustion gas, said gas generator body including an outlet for the combustion gas.

4,019,320

EXTERNAL GAS TURBINE ENGINE COOLING FOR CLEARANCE CONTROL

Ira H. Redinger, Jr., Vernon; David Sadowsky, and Philip S. Stripinis, both of South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 5, 1975, Ser. No. 638,132
Int. Cl.² F02C 7/18
U.S. Cl. 60—226 R 8 Claims



1. For a turbofan engine operating over a range of power having a fan discharge duct, a turbine, a casing surrounding the turbine, and turbine seal means extending inwardly from said casing means for controlling the clearance between the tip of the turbine and the turbine seal means, said means including a plurality of axially spaced flanges extending outwardly from said casing, at least one tube circumferentially mounted about said engine case adjacent to said flanges, connection means interconnecting the fan discharge duct and said tube whereby the cool fan discharge air is directed to impinge on the side wall of said flange and said flange being sufficiently structured so that the effect of cooling causes the engine case to shrink to reduce the diameter of said air seal and the clearance between the turbine tip and said air seal and means for selectively turning the flow of air on and off at a given power condition of said range of power.

4,019,321

CONTROLS FOR A HYDRAULICALLY DRIVEN VEHICLE

Ryozo Aoyama; Yukinobu Matsuda, and Mitsuo Urushima, all of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Oct. 8, 1975, Ser. No. 620,817
Claims priority, application Japan, Oct. 8, 1974, 49-120932; Feb. 26, 1975, 50-22738
Int. Cl.² F15B 11/16
U.S. Cl. 60—484 5 Claims

1. Controls for a hydraulically driven vehicle, comprising

a. a hydraulic pressure source for travel,

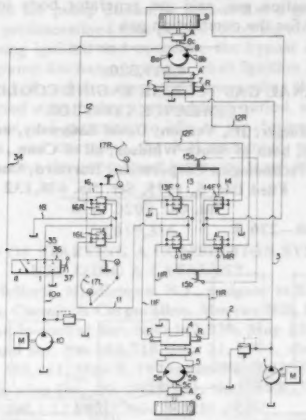
b. a primary valve means connected in a continuous manner with said hydraulic pressure source for travel,

c. a motor connected in a continuous manner with said primary valve means,

d. a hydraulic pressure source for a pilot fluid,

e. a secondary valve means, wherein one end is connected in a continuous manner with said hydraulic pressure source for the pilot fluid, and the other end is connected in a continuous manner with said primary valve means, such that actuation of said primary valve means causes said secondary valve means to be kept energized in a position for drainage at all times,

f. a tertiary valve means is fitted in place on a pilot pipeline connected in a continuous manner with said hydraulic



pressure source for the pilot fluid such as to be retained in an energized state at a connecting position at all times for conducting proper control of the drive of the vehicle,

g. a parking brake mounted in place on an output shaft of a motor for travel, and

h. a parking brake valve, wherein one end is connected in a continuous manner with said hydraulic pressure source for the pilot fluid, and the other end is connected in a continuous manner with said parking brake.

4,019,322

HOT-GAS RECIPROCATING ENGINE

Roelf Jan Meijer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

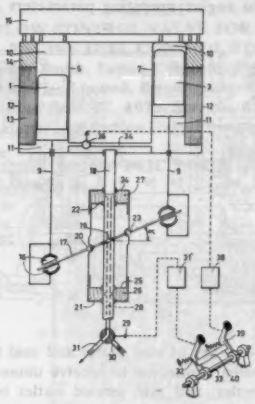
Filed Oct. 30, 1975, Ser. No. 627,107

Claims priority, application Netherlands, Jan. 22, 1975, 7500731

Int. Cl.² F02G *1/06*

U.S. Cl. 60—525 **1 Claim**

1. A hot-gas reciprocating engine comprising at least three piston-like bodies which are each movable in an associated cylinder and which each separate a hot and a cold space in the relevant cylinder, each of the hot spaces communicating, via a regenerator, with one of the cold spaces in an other cylinder, each of the pistion-like bodies furthermore being provided with a drive rod which cooperates, by way of a sliding body, with a plate which is mounted on a rotatable shaft in such a manner that this plate cannot rotate with respect to the shaft but can be tilted about a tilting shaft extending transversely of the first-mentioned shaft, and means being provided for tilting the plate, characterized in that each of the cold spaces communicates, via a duct incorporating a controllable valve, with a cold space in an other cylinder, means for operating these valves being provided which are so constructed that, when the valves are opened, these means also operate the means for tilting the plate, so that the plate assumes a more inclined position with respect to the shaft, whilst the means for tilting



the plate can be operated independently of the means for operating the valves.

4,019,323

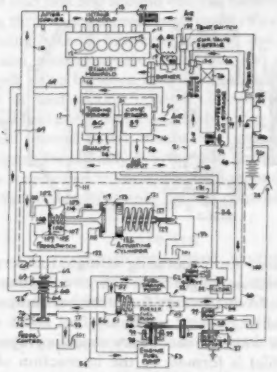
CONTROLLER FOR TURBOCHARGER SYSTEM FOR INTERNAL COMBUSTION ENGINES

Arthur A. Zuhn, E. Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 1, 1975, Ser. No. 636,511

Int. Cl.² F02B *33/44*

U.S. Cl. 60—606 **7 Claims**



1. In a turbocharger system for an internal combustion engine having an exhaust manifold and an intake manifold adjacent to the engine, a turbine communicating with the exhaust manifold and driven by gases therefrom, a compressor driven by said turbine and having an output which communicates with said intake manifold, a fuel burner chamber having an input for receiving compressed air, a spark igniter, and an output through which expanded gases pass, means communicating the output of said compressor to the input of said fuel burner chamber, means communicating the output of said fuel burner chamber into and through the exhaust manifold, means for supplying a variable quantity of fuel from a fuel reservoir to said burner chamber and means responsive to intake manifold pressure to vary the quantity of fuel delivered to said burner, an improvement comprising:

means for preventing supply of said variable quantity of fuel to said burner unless said fuel is at a fuel pressure above the pressure in said burner; and

means responsive to said fuel being at least equal to a selectively set minimum fuel pressure value for activating said spark igniter in said burner chamber.

4,019,324
INTERNAL COMBUSTION ENGINE

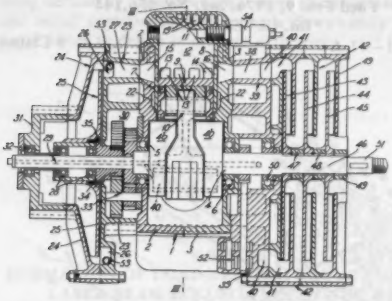
John R. Coxon, "Penfound," Stane St., Pulborough, England

Filed Sept. 3, 1975, Ser. No. 609,967

Claims priority, application United Kingdom, Sept. 11, 1974, 39678/74

Int. Cl.² F02G *3/00*

U.S. Cl. 60—624 **17 Claims**



1. In an internal combustion engine including a crankshaft, a cylinder, a cylinder head, a piston reciprocably mounted in said cylinder, means drivingly connecting said piston to said crankshaft, a combustion chamber defined and bounded by said cylinder, said cylinder head, and said piston, means defining inlet ports and outlet ports for said combustion chamber, air intake means, means defining an inlet duct for conducting air fro said air intake means to said inlet ports for supply to said combustion chamber for combustion with fuel to drive said piston and hence said crankshaft, and means defining an exhaust duct communicating with said exhaust ports for conducting post combustion gases away from said combustion chamber, the improvement wherein said engine further includes an air compressor between said air intake means and said inlet duct whereby said air conducted by said inlet duct is compressed, a plurality of passage means leading from said inlet duct and extending in said engine closely around said combustion chamber whereby compressed air flows through said passage means from said inlet duct to extract heat from said engine surrounding said combustion chamber, and a turbine having a power output shaft, rotor means attached to said power output shaft, and high pressure gas inlet means communicating with said exhaust duct and said passage means whereby hot compressed gases from said combustion chamber and said passage means expand through said turbine to drive said rotor means and hence said power output shaft.

4,019,325
ENERGY CONVERTER

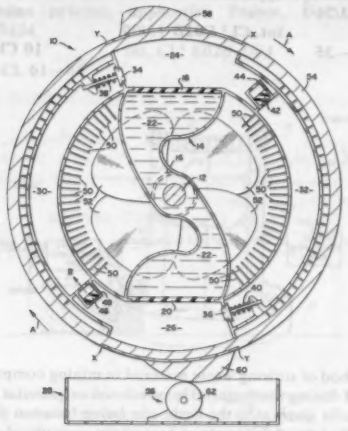
Paschal H. Murphy, Jr., Rte. 2, Box 104B, Zephyrhills, Fla. 33599

Filed Sept. 5, 1975, Ser. No. 610,790

Int. Cl.² F01K *27/00*

U.S. Cl. 60—643 **24 Claims**

1. An energy converter of the type primarily used to convert thermal energy into mechanical energy, said energy converter comprising: support means; axle means rotatable disposed on said support means; rotor means mounted on said axle means in substantially transverse relation to the axis of rotation of said axle means; flywheel means disposed in substantially concentric relation to said axis of rotation for rotation with said rotor means; heating chamber means disposed in fluid-communicating relation to one end of said rotor means; exhaust chamber means disposed in fluid-communicating relation to said heating chamber means; an expansible fluid placed in said heating chamber means; valve means interconnecting



said heating and exhaust chamber means whereby the flow of said fluid therebetween may be regulated; and thermal supply means operatively disposed relative to said heating chamber means enabling heating of at least a portion of said rotor means causing a displacement of mass within said rotor means thereby rotating said axle.

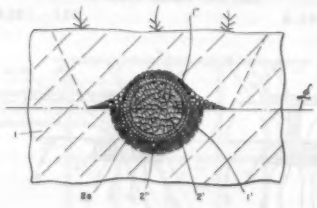
4,019,326
NONWOVEN HORIZONTAL DRAINAGE SYSTEM

Wilhelm Herveling, Wuppertal; Alfred Birker, Neviges-Donberg; Berthold H. Daimler, Remscheid-Lennep, all of Germany; Jan G. Vos, Dieren (Gld.), Netherlands, and Hans Stapp, Momlingen, Germany, assignors to Akzona Incorporated, Asheville, N.C.

Filed Dec. 4, 1972, Ser. No. 311,656

Int. Cl.² E02B *11/00*

U.S. Cl. 61—11 **4 Claims**



1. A horizontal soil drainage system consisting of a nonwoven three-dimensional mat in tubular form comprising a plurality of looped, intersecting and substantially amorphous continuous filaments of melt-spun synthetic polymers self-bonded together at their intersections, said mat forming at least one central cavity throughout its length, and having an inner peripheral zone adjacent said central cavity and an outer peripheral zone and a center zone between said inner and outer peripheral zones, and wherein at least one of said peripheral zone of said mat has a lower cross-sectional porosity than the center zone of said mat.

4,019,327

MINING

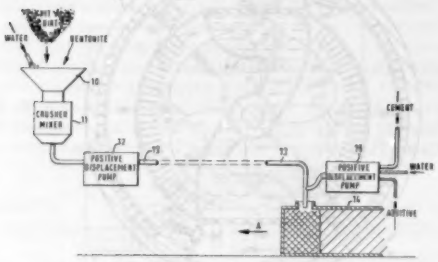
Edward Kempster, Llanelly, Wales, assignor to Thyssen (Great Britain) Limited, Wales

Continuation of Ser. No. 271,212, July 12, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,099

Claims priority, application United Kingdom, Sept. 20, 1971, 43793/71

Int. Cl.² E02D 15/00

U.S. Cl. 61—35 10 Claims



1. A method of stowing waste material in mining comprising the steps of mixing the material in powdered or granular form with bentonite and water, the bentonite being between 0.05% and 4% by weight of the total solids, and the quantity of water being such that, with the bentonite, the waste material forms a flowable sludge of a suitable consistency for pumping and having a slump of two to four inches, the bentonite enabling such a sludge to be formed with substantially less water than would be required in the absence of bentonite, pumping the material through a pipe line to a point of utilization using a positive displacement pump, mixing the pumped material immediately as it arrives at that point through said pipe line with a quick setting agent comprising cement, and allowing the mixed material to solidify, the sludge, due to the presence of the bentonite, containing only a small amount of water such that it can set to form a solid without draining of water from the pumped material.

4,019,328

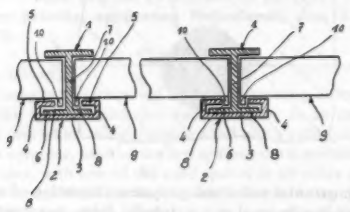
ARRANGEMENT FOR MAKING A PREFABRICATED WALL

Jean Marie Gérard Koehl, 3, rue Varengue 92340, Bourg-la-Reine, France

Filed Dec. 8, 1975, Ser. No. 638,351

Int. Cl.² E02D 5/00

U.S. Cl. 61—41 A 11 Claims



1. An arrangement for erecting a pre-fabricated wall, comprising a section having a T-shaped wing in configuration placed parallel to said wall, including an I-shaped section having a web and two wings, a C-shaped section with a plane web and two wings having respective ends comprising a portion bent parallel to the web of said C-shaped section, one of the wings of the I-shaped section being slidably engageable inside the C-shaped section in such a way that said ends constitute, with the web of the I-shaped section and the inner surface of the wing of said section when engaged in the C-shaped section, at least one groove-shaped interval, and a substantially plane element provided at least at one of the ends thereof with a guiding means angularly placed to a wall of said substantially plane element, said substantially plane element being engaged between the wings of the I-shaped section in such a way that said guiding means is engaged in said groove when a wall of said element opposite the wall provided with said guiding means is brought in contact with the wing of the I-shaped section opposite the wing engaged in the C-shaped section.

4,019,329

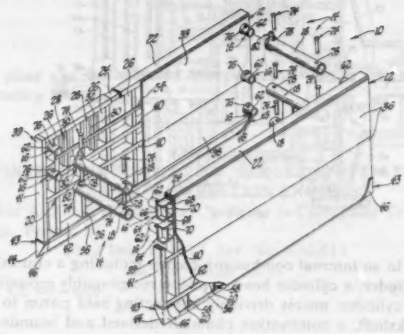
TRENCH SHORING ASSEMBLY

James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015

Filed Feb. 9, 1976, Ser. No. 656,145

Int. Cl.² E21D 5/00

U.S. Cl. 61—41 A 9 Claims



1. A trench shoring assembly comprising: a pair of spaced wall means for vertical disposition within a trench, and connecting means interconnecting said wall means for allowing limited pivotal movement between said wall means, said connecting means including a plurality of support means rigidly attached to each of said wall means adjacent each end thereof and extending from said wall means in opposite directions toward one another, a plurality of spreader means extending between opposed pairs of said support means for spacing said wall means apart, said spreader means overlapping a portion of said support means and including slot means extending through the overlapping portions of said spreader means and said support means, and pin means extending through said slot means for attaching said spreader means to said support means and being at least in part larger than said pin means for allowing said limited movement between said spreader means and said support means.

4,019,330

TRENCH SHORING ASSEMBLY WITH ABRASION PROTECTION DEVICE

James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015

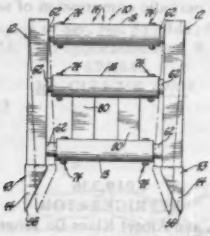
Filed Feb. 9, 1976, Ser. No. 656,149

Int. Cl.² E21D 5/00

U.S. Cl. 61—41 A 3 Claims

1. A trench shoring assembly of the type including a pair of interconnected spaced wall means, said assembly comprising: wall means having a predetermined thickness and a tapered bottom portion defining a triangularly shaped pointed lower extremity extending between the ends thereof, said triangularly shaped pointed lower extremity being defined by metal plates extending upwardly at an acute angle relative to one another away from said pointed lower extremity, and abrasion protection means disposed at said pointed lower extremity and

extending between said ends thereof for protecting the bottom of said wall means against abrasion, said protection means



being defined by a metal which is more abrasion resistant than said metal components and extends downwardly from said metal plates to define said lower extremity.

4,019,331

FORMATION OF LOAD-BEARING FOUNDATIONS BY LASER-BEAM IRRADIATION OF THE SOIL

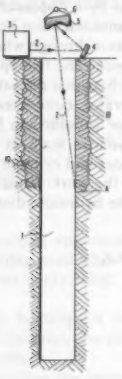
Josef Rom, Haifa; Israel Alterman, Savyon, and Joseph Schwartz, Haifa, all of Israel, assignors to Technion Research and Development Foundation Ltd., Haifa and Israel Alterman, Savyon, both of, Israel, part interest to each

Continuation-in-part of Ser. No. 645,415, Dec. 30, 1975. This application Mar. 10, 1976, Ser. No. 665,394

Claims priority, application Israel, Dec. 30, 1974, 46361

Int. Cl.² E02D *7/00*

U.S. Cl. 61—53.54 **9 Claims**



1. A method of converting clayey or silty soil into a stable and solid underground column or pile suitable for supporting a building structure, which comprises

drilling into the earth to a predetermined depth a bore hole of a diameter considerably smaller than the external diameter of the column or pile to be created,

directing a focused laser beam gradually across the entire surface of said bore, in such a manner that each point of the bore surface is irradiated and heated at an intensity sufficient for converting the soil surrounding the bore into a solid mass of a predetermined thickness measured from the bore surface.

4,019,332

DEVICES FOR PROTECTING THE BASES OF STRUCTURES IMMERSED IN A VOLUME OF WATER AGAINST UNDERMINING

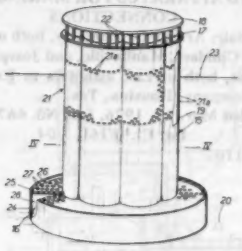
Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to C. G. Doris, Paris, France

Filed Dec. 24, 1975, Ser. No. 644,153

Claims priority, application France, Dec. 31, 1974, 74.43434

Int. Cl.² E02B *3/04*

U.S. Cl. 61—86 **10 Claims**



1. A combination for protecting the base of a structure having a base resting on the bed of a body of water with sub-aquatic currents against undermining by the effect of said currents, comprising, a continuously vertically extending member in said structure reaching a predetermined height above said bed, an imperforate wall extending without interruption substantially parallel to the vertically extending member of the structure at a distance from said vertically extending member in the direction of the body of water to thereby intercept said currents in the direction toward and away from said member, and providing a space between the top of the wall and the member free of obstacles which would prevent water from entering that space thereby to permit said sub-aquatic water currents to induce water currents reaching the bed of said body of water in that space, said imperforate wall reaching from the bed of the body of water to a height which is but a minor fraction of the depth of the body of water and said height of said member whereby the entirety of the wall is deeply immersed in the water.

4,019,333

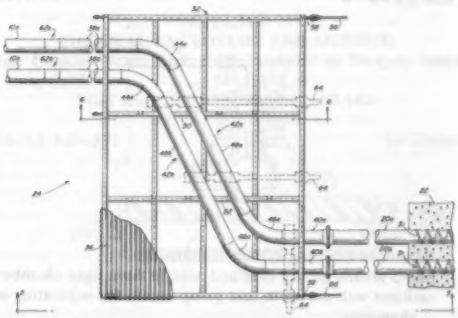
APPARATUS AND METHOD FOR BUFFERING SUBMERGED CONDUITS

Demir I. Karsan, 33 Oaken Lane, London, England

Filed Dec. 24, 1975, Ser. No. 644,183

Int. Cl.² F16L *1/00, 51/00*

U.S. Cl. 61—110 **15 Claims**



1. A buffer unit for linking an underwater riser to an underwater pipeline, comprising

an enclosure positioned intermediate said riser and said pipeline

first and second conduit segments projecting from said enclosure for coupling to said riser and said pipeline, respectively, and

conduit means within said enclosure connecting said first and second conduit segments and comprising an expansion mechanism;

said enclosure having internal means that support, while permitting movement of, said expansion mechanism within said enclosure.

4,019,334

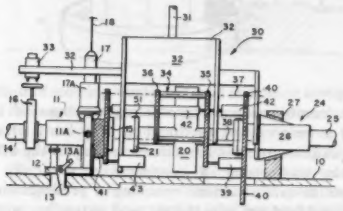
METHOD AND APPARATUS FOR MAKING SUBSEA PIPE CONNECTIONS

Albert R. Sinclair; Arthur C. Daughtry, both of Houston, Tex.; Thomas W. Childers, Mandeville, and Joseph A. Burkhardt, New Orleans, both of La., assignors to Exxon Production Research Company, Houston, Tex.

Filed Mar. 17, 1976, Ser. No. 667,758

Int. Cl.² F16L *1/04*

U.S. Cl. 61—110 **10 Claims**



1. A method for connecting a spool piece hub, connected to a subsea structure manifold, to a fixed pipeline hub aligned for connection to said spool piece hub comprising the steps of:

lowering a remotely operated connecting tool from the water's surface;

guiding said connecting tool onto said pipeline and said manifold;

latching said connecting tool to said spool piece;

moving said spool piece hub by means of said connecting tool into engagement with said pipeline hub; and

clamping said engaged hubs together by means of said connecting tool.

4,019,335

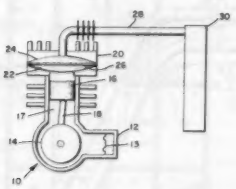
HYDRAULICALLY ACTUATED SPLIT STIRLING CYCLE REFRIGERATOR

Calvin W. Browning, Torrance, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Jan. 12, 1976, Ser. No. 648,432

Int. Cl.² F25B *9/00*

U.S. Cl. 62—6 **18 Claims**



1. A fluid handling system comprising:

pump means having first and second fluid tight chambers;

resilient wall means in said pump means for separating said chambers;

hydraulic displacing means connected to one of the chambers of said pump means and a source of hydraulic fluid for periodically deflecting said resilient wall means by displacement of said fluid;

fluid compressing means connected to the other chamber of said pump means and a second source of fluid whereby periodic deflection of said wall means by said displacing means causes periodic compression of said second fluid.

4,019,336

REFRIGERATOR

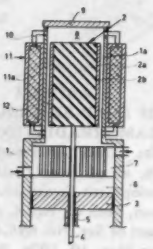
Andries Mijnheer, and Albert Klaas De Jonge, both of Emmasingel, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 527,243, Nov. 26, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,737

Claims priority, application Netherlands, Sept. 11, 1973, 7312488

Int. Cl.² F25B *9/00*

U.S. Cl. 62—6 **1 Claim**



1. A refrigerator comprising a compression space of variable volume and higher mean temperature during operation which communicates with an expansion space of lower mean temperature during operation, the volume of the said expansion space being variable by a displacer which is reciprocatable in a cylinder, the communication between the said spaces incorporating a regenerator through which a working medium can flow to and fro between the two spaces, characterized in that the communication between the said two spaces incorporates an auxiliary regenerator, connected parallel to the regenerator and formed by an annular gap between the displacer and the cooperating cylinder wall, at least one of the two facing surfaces of displacer and cylinder having a high thermal capacity with respect to the working medium flow through the gap during operation, the hydraulic diameter of the gap satisfying the relation:

$$0.4\,d_h \qquad d_h \qquad 1.4\,d_h$$

where

$$d_h = 2.8\sqrt[4]{\frac{s \cdot \eta^2 \cdot L}{\rho \cdot \Delta \cdot P}}$$ in which

d_h = hydraulic diameter of the gap

s = stroke length of the displacer

η = mean dynamic viscosity of the working medium in the gap

L = length of the gap

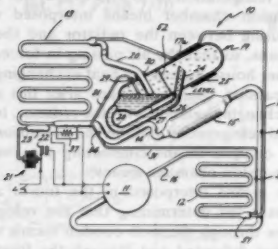
ρ = mean density of the working medium in the gap

ΔP = mean pressure drop across the regenerator.

4,019,337
REFRIGERATION APPARATUS AND METHOD

Elmer W. Zearfoss, Jr., 929 Magee Ave., Philadelphia, Pa. 19111

Continuation-in-part of Ser. No. 517,141, Oct. 23, 1974, Pat. No. 3,955,374. This application Apr. 8, 1976, Ser. No. 674,849
Int. Cl.² F25B 39/04
U.S. Cl. 62—113 18 Claims

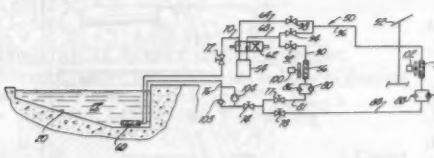


16. In a refrigeration system of the kind having a conduit including a capillary tube for expanding refrigerant flowing from a condenser to an evaporator, a method for controlling to optimize refrigerant flow in said system, comprising the steps of: sensing a superheat gain in said evaporator; applying expanded liquid refrigerant in heat exchange with said conduit in response to said gain, and subcooling refrigerant in said conduit to increase flow therethrough; sensing a superheat loss in said evaporator; and reducing activity of said heat exchange in response to said loss, thereby to decrease flow in said conduit.

4,019,338
HEATING AND COOLING SYSTEM

Everett E. Poteet, 275 N. Berkshire, Bloomfield Hills, Mich. 48013

Filed Jan. 9, 1976, Ser. No. 647,919
Int. Cl.² F25B 13/00
U.S. Cl. 62—238 3 Claims



1. A heating and cooling apparatus for heating water contained within a swimming pool while cooling the interior of a building, said apparatus comprising:

a compressor;

a first condenser for heating the water within said pool;

a conduit means connecting the output of said compressor to said first condenser;

an evaporator for cooling the interior of said building, said conduit means connecting the output of said condenser to the intake of said evaporator and the outlet of said evaporator to said compressor;

a first throttle valve disposed in said conduit means between said first condenser and said evaporator;

a second condenser;

first valve means for selectively communicating said second condenser to said compressor and said evaporator for selectively cooling said building while not heating said pool;

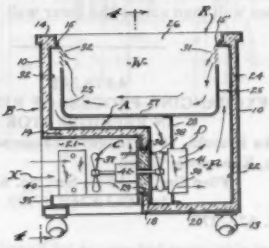
second valve means for communicating the outlet of said first condenser to said second condenser; and

second throttle means disposed between said first and second condensers whereby said second condenser functions as an evaporator and said pool water is heated while not cooling the interior of said building.

4,019,339
SYSTEM AND COLD CABINET SERVER

William G. Anderson, 5942 Gildred Circle, Huntington Beach, Calif. 92647

Filed Aug. 20, 1975, Ser. No. 606,094
Int. Cl.² A47F 3/04
U.S. Cl. 62—255 5 Claims

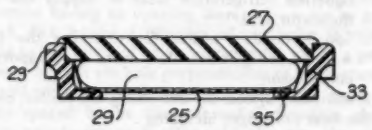


1. A Cold Cabinet for conditioning prepackaged foods and the like to maintain refrigeration of the same and including; a bin type cabinet with insulated side and end and bottom panels, the bottom panel being stepped with a bulkhead disposed between the end panels dividing the cabinet into an equipment chamber exterior thereto and a recirculation chamber interior thereto and there being an opening through the bulkhead, a baffle within the cabinet and disposed between the end panels in spaced relation to the bulkhead and there being an opening through the baffle, said openings in the bulkhead and baffle being aligned, an upwardly open well complementary to and depending into the cabinet with side and end and bottom walls in spaced relation to the aforementioned body panels respectively, the bottom wall of the well being engaged with and carrying the baffle dividing the space between the cabinet panels and well walls into an air intake means vented from the well and an air recirculating means vented into the well, and a replaceable refrigeration unit comprised of closure means disengageable in the bulkhead opening and an evaporator disengageable in the baffle opening and a blower means having a motor shaft with an exterior refrigeration cooling fan in said equipment chamber and extending into said recirculation chamber with an interior recirculating fan for moving air from the intake means and through the evaporator and into the recirculating means.

4,019,340
THERMAL ENCLOSURE AND METHOD

Hale Conklin, Santa Ana, Calif., assignor to Divajex, Santa Ana, Calif.

Filed Aug. 27, 1975, Ser. No. 608,182
Int. Cl.² F25D 3/08
U.S. Cl. 62—371 16 Claims



1. A wall section for a thermal enclosure comprising:

a frame having inner and outer ends and a passage extending into said frame in a generally axial direction from said outer end toward said inner end;

said frame being integrally molded from an insulating material and including a peripheral wall and a ledge exposed within the peripheral wall, said ledge being axially inwardly of said outer end;

an inner wall having an edge portion, said edge portion being supported by said ledge and being intermediate the ledge and the outer end of said frame;

an outer wall affixed to the frame and closing the passage at a location spaced axially outwardly from said inner wall;

first means in said passage at least partially between the outer wall and the inner wall for adding heat or removing heat; and

the physical characteristics of the inner wall and the outer wall being such that more heat transfer occurs across the inner wall than across the outer wall.

4,019,341

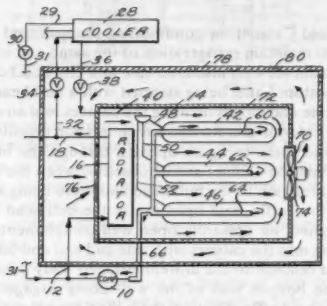
HEAT EXCHANGING PROCESS OF REFRIGERANT GAS IN REFRIGERATOR

Moritaka Iwasaki, 10-1, Idogaya Nakamachi, Minami, Yokohama, Kanagawa, Japan

Filed Dec. 3, 1975, Ser. No. 637,411

Int. Cl.² F25B *47/00*

U.S. Cl. 62—277 **1 Claim**



1. In a refrigeration system having:

a. a compressor for compressing a refrigeration fluid;

b. a heat exchanger including a radiator for subtracting heat from the compressed refrigeration fluid;

c. first conduit means for supplying the compressed refrigeration fluid from the compressor to the radiator;

d. a condenser for liquefying the compressed, cooled refrigeration fluid;

e. second conduit means for supplying the compressed, cooled refrigeration fluid from the radiator to the condenser;

f. an evaporator juxtaposed with a cooler from which heat is to be subtracted by the refrigeration fluid;

g. third conduit means connected with the evaporator for forwarding the compressed, cooled, liquefied refrigeration fluid towards the evaporator;

h. an expansion valve interposed in the third conduit means, for permitting evaporation of the compressed, cooled, liquefied refrigeration fluid to supply the evaporator therewith; and

i. fourth conduit means for returning the evaporated, warmed refrigeration fluid from the evaporator to the compressor;

a defrosting system for defrosting the cooler, comprising:

the heat exchanger including :

an inner housing enclosing the radiator;

first opening means defining an air inlet to the inner housing;

second opening means defining an air outlet from the inner housing; and

forced draft means for pulling air into the inner housing through the first opening means, flowing the air over the radiator to subtract heat from the radiator, and pushing the heated air out the second opening means;

the defrosting system further including:

fifth conduit means interconnecting the radiator with the evaporator for supplying refrigeration fluid from the evaporator to the evaporator;

switching valve means between the second and fifth conduit means for determining whether the refrigeration fluid leaving the radiator will be forwarded to said condenser for refrigeration or to said evaporator for defrosting;

expansion chamber means interposed within said inner housing between the radiator and the second opening means, so that the air passing in forced draft within the inner housing passes in heat exchanging relation with the expansion chamber means after this air passes in heat exchanging relation with the radiator, to heat fully vaporized refrigeration fluid in the expansion chamber means;

sixth conduit means connecting the evaporator with the expansion chamber means;

valve means interposed in the fourth and sixth conduit means for determining that the refrigeration fluid will flow through the sixth conduit means while the cooler is being defrosted and through the fourth conduit means while the cooler is being refrigerated; and

seventh conduit means for returning heated refrigeration fluid from the expansion chamber means to the compressor.

4,019,342

COMPRESSOR FOR A REFRIGERANT GAS

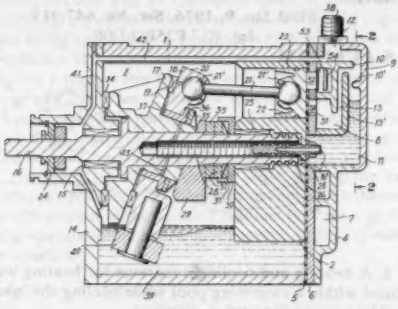
Motomu Ohta, Sakashi, Japan, assignor to Cegedur Societe de Transformation de l'Aluminium Pechiney, Paris, France

Filed Jan. 30, 1976, Ser. No. 654,007

Claims priority, application Japan, Mar. 13, 1975, 50-30969

Int. Cl.² F25B *43/02*; **F04B** *17/00, 35/00, 39/02*

U.S. Cl. 62—469 **9 Claims**



1. In a compressor for a refrigerant gas wherein in a casing a drive shaft is coupled to a rotor which acts on an inclined rocking plate to effect rocking thereof and reciprocation of a piston in a cylinder bore to produce suction and exhaust strokes for refrigerant gas, a lubricant in a sump in the casing being atomized and mixing with refrigerant gas leaking past the piston, an improvement wherein the compressor has an inlet for the refrigerant gas, duct means for conveying the mixture of leaked refrigerant gas and lubricant from said casing under the action of the suction stroke of the piston, said duct means communicating with the inlet for refrigerant gas to mix the leaked refrigerant gas and lubricant with incoming refrigerant gas, separator means downstream of said inlet for separating the lubricant from the refrigerant gas, and lubricant delivery means on said drive shaft for returning the separated lubricant back to the sump, said separator means including a

lubricant reservoir in communication with said lubricant delivery means.

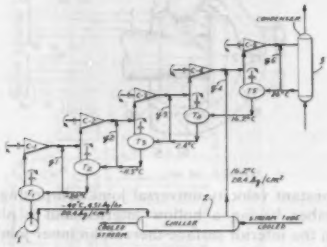
4,019,343
REFRIGERATION SYSTEM USING ENTHALPY CONVERTING LIQUID TURBINES

Edward S. Roberts, 214-05 33rd Ave., Bayside, Queens, N.Y. 11361

Continuation-in-part of Ser. No. 648,628, Jan. 13, 1976, abandoned. This application Apr. 23, 1976, Ser. No. 679,690

Int. Cl.² F25B *1/10*

U.S. Cl. 62—510 **8 Claims**



1. In a refrigeration system in which a refrigerant is cooled by self evaporation with compression of vapors and condensation, the improvement which comprises,

a. introducing the cold refrigerant at a preselected temperature through a chilling zone in which it is in heat exchange with the material to be cooled and passes through with or without change of phase of at least part of the liquid, and

b. flowing liquid from the refrigerant condenser through a series of enthalpy converting liquid turbines, entering one of which it is joined by any heated refrigerant liquid from the chilling zone, in each turbine the liquid decreases in pressure and temperature and vapors are separated, each turbine being paired with a vapor compressor receiving the separated vapors and each turbine passing liquid on to the next turbine in the series, the compression of vapors being to the pressure of the preceding turbine.

4,019,344
SYMETRICAL SEALED GEAR COUPLING

Michael Mircea Calistrat, Baltimore, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Nov. 24, 1975, Ser. No. 634,766

Int. Cl. F16d *3/18*

U.S. Cl. 64—9 R **5 Claims**

1. A gear type flexible coupling for connecting a pair of substantially axially aligned shafts comprising in combination:

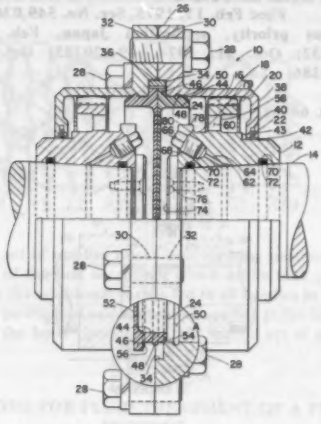
substantially identical first and second hub means, adapted for connection to respective ones of said shafts, having a ring of external gear teeth thereon;

substantially identical, axially-connected, first and second sleeve means surrounding said hub means and having a ring of internal gear teeth therein in operative engagement with said external gear teeth;

aligning ring means seated within facing annular recesses in said sleeve means and extending axially therebetween for radially aligning said sleeve means;

substantially identical first and second flexible sealing ring means, seated in outer end portions of said sleeve means, surrounding outer end portions of said hub means and in sealing engagement therewith; and

substantially identical first and second removable sealing cup means seated within the inner periphery of said sleeve means of closing inner end portions of said sleeve means to retain lubricant within each of said sleeve means between said cups and said flexible metallic sealing ring means each said seal cup means having annular detent means around a tubular flange portion thereof and each said sleeve means having a corresponding annular recess



in the interior thereof for seating and removably retaining said cup means therein during separation of said sleeve means with one of said hub means therein.

4,019,345
FLEXIBLE COUPLING FOR ROTATING SHAFTS

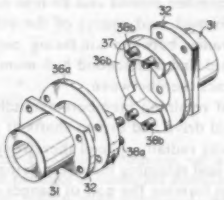
Kazuichi Fukuda, Fujisawa, Japan, assignor to Kanto Special Steel Works, Ltd., Fujisawa, Japan

Filed Dec. 15, 1975, Ser. No. 641,035

Claims priority, application Japan, May 12, 1975, 50-56596; Oct. 8, 1975, 50-137615[U]; Oct. 8, 1975, 50-137616[U]

Int. Cl. F16d *3/58*

U.S. Cl. 64—12 **9 Claims**

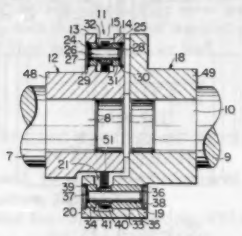


1. A flexible coupling for rotating shafts, which comprises a pair of hub members each having a flange and being for connection, respectively, with a drive shaft and a driven shaft, and a main set removably mounted between the flanges of the respective hub members facing each other, said main set having a pair of disks and a plurality of connecting members, each connecting member being composed of a plurality of connecting laminations of resilient thin sheet material and each having an ovaloidal shape having curves connecting a narrowed central portion with semi-circular end portions and each end portion having an opening therein for a pin to go through, each disk having a plurality of pin holes therein perpendicular to said disk and on a common pitch circle, a pin tightly mounted in each pin hole perpendicular to the surface of the disk and welded to said disk, each two adjacent pins being equally spaced in the circumferential direction, the disks of each pair facing each other with the pins therein projecting toward the opposite disk and the pins of the respective disks alternating with each other at equal distances, said connecting members connecting adjacent pins for forming a polygonal linkage along the surface of the disks in the circumferential direction thereof.

4,019,346
FLEXIBLE COUPLING FOR ROTATING SHAFTS

Kazuichi Fukuda, Yokohama, Japan, assignor to Kanto Special Steel Works Ltd., Japan

Filed Feb. 11, 1975, Ser. No. 549,036
Claims priority, application Japan, Feb. 13, 1974, 49-17932; Oct. 21, 1974, 49-120285; Oct. 21, 1974, 49-120286
Int. Cl.² F16D 3/58
U.S. Cl. 64—12 14 Claims



1. A flexible coupling for transmitting torque from a drive shaft to a driven shaft, said flexible coupling comprising:

a first hub member attached to said drive shaft;

a second hub member attached to said driven shaft;

each said hub member having a pair of outwardly extending flanges, the flanges of each hub member being axially spaced from each other with a space therebetween;

the pair of flanges of each said hub member having portions thereof cut away to form void spaces, each defined by and adjoined to projections forming the respective pair of flanges;

said first and second hub members being constructed such that when axially abutted end-to-end, the projections of one hub member extend and fit into respective complementary formed void spaces of the other hub member, with clearance between all facing complementary surfaces of said first and second hub members so that there is no contact therebetween;

a plurality of retaining members extending parallel to the axes of said drive and driven shafts at positions substantially equally radially spaced therefrom;

one each of said retaining members being supported by the projections forming the pair of flanges of one of said hub members, each said retaining member having one axial end thereof supported by a first flange of the respective hub member and the other axial end thereof supported by a second flange of said respective hub member, said retaining member thereby spanning the axial space between said pair of flanges of said respective hub member;

said retaining members being alternately supported by said first and second hub members, in the circumferential direction of said coupling;

a plurality of laminated connecting members, each formed by a plurality of sheet-like connecting elements;

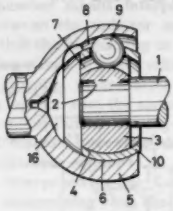
each said connecting member being mounted at a first end thereof to one of said retaining members supported between the pair of flanges of said first hub member and at a second end thereof to the next circumferentially adjacent one of said retaining members supported between the pair of flanges of said second hub member; and

the thus connected connecting members thereby connecting said first and second hub members, and together forming a circumferential polygonal link substantially in a plane perpendicular to said axes of said drive and driven shafts.

4,019,347
BALL GROOVES FOR A CONSTANT VELOCITY UNIVERSAL JOINT

Werner Krude, Neunkirchen, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach am Main, Germany

Filed July 11, 1975, Ser. No. 595,089
Claims priority, application Germany, July 11, 1974, 2433349
Int. Cl.² F16D 3/30
U.S. Cl. 64—21 3 Claims

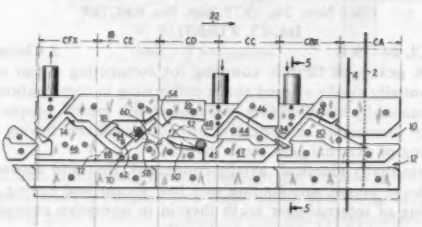


1. A constant velocity universal joint comprising an outer joint member having a hollow interior and a plurality of grooves in the interior surface thereof, an inner joint member within said outer joint member and having a corresponding plurality of grooves in its outer surface, said inner and outer joint member grooves being opposed from each other to define pairs of opposed grooves, a ball in each pair of opposed grooves contacting a surface of each of said grooves at one point under a torque load, a cage between said joint members having a plurality of radial openings to retain said balls therein, and means in each of said grooves for defining a further contact point for said balls under all bending angles of the joint and under torque load.

4,019,348
METHOD AND APPARATUS FOR SELECTIVELY RENDERING NEEDLES OPERATIVE AND INOPERATIVE ON A CIRCULAR KNITTING MACHINE

Morris Philip, c/o Philip Knitting Mill, 26 Bruckner Blvd., Bronx, N.Y. 10454

Filed May 14, 1975, Ser. No. 577,237
Int. Cl.² D04B 9/22
U.S. Cl. 66—24 11 Claims

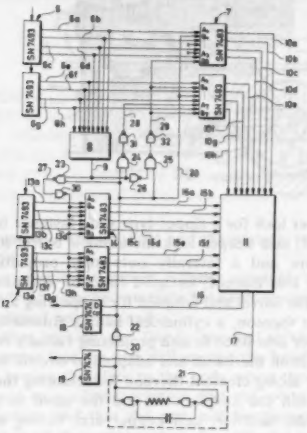


1. In a method of knitting a tubular fabric with both rib and plain portions on a dial and cylinder circular knitting machine having a plurality of needle sets thereon, the needles in each of said sets being movable, forwardly from a cast off position through a knitting cycle the steps of moving at least one of the sets of needles rearwardly of said cast off position to an inactive position and maintaining said rearwardly moved needles in said inactive position until at least one course is knitted by the remaining needle set or sets whereby said needles in said inactive position do not knit and do not have any fabric thereon.

4,019,349
METHOD AND APPARATUS FOR ELECTRONIC CONTROL OF MULTIFEED CIRCULAR KNITTING MACHINES

Ivo Kouklik, Trebic, Czechoslovakia, assignor to Elitex, Zavody textilniho strojirenstvi generalni reditalstvi, Liberec, Czechoslovakia

Filed Nov. 1, 1974, Ser. No. 519,830
Claims priority, application Czechoslovakia, Nov. 2, 1973, 7532/73
Int. Cl.² D04B 15/66
U.S. Cl. 66—154 A 8 Claims



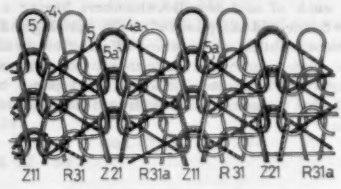
1. The method for reading the storage matrix of a circular knitting machine having a plurality of needles arranged in order with respect to a given first needle, the output of which is fed to independent means for selecting needles associated with two or more separate simultaneously operable feed systems distributed about the needle cylinder, comprising the steps of counting during each revolution the passage of said needles by a given point and simultaneously arithmetically imposing an appropriate constant on said count depending upon the position of the first needle in said cylinder with respect to each of the subsequent selecting means to determine from said counting the location of a particular needle at any given time at each of said independent selecting means, and successively feeding the several determinations to said matrix, to thereafter successively read said matrix with respect to the position of the needles in each of said separate feed systems and means for feeding the output of said matrix to said associated independent selecting means in timed relationship therewith.

4,019,350
METHOD OF PRODUCING DOUBLE-KNIT FABRIC HAVING ADDITIONAL FLEECE THREADS INCORPORATED INTO ONE FACE OR BOTH FACES THEREOF

Walter Richard Schmidt, Breisach am Rhine, Germany, assignor to Burlington AG, Switzerland

Filed Mar. 18, 1974, Ser. No. 452,358
Claims priority, application Germany, Mar. 19, 1973, 2313651; Feb. 18, 1974, 2407736
Int. Cl.² D04B 9/26
U.S. Cl. 66—196 16 Claims

1. A method of producing an improved double-knit fabric comprising a backing fabric having additional threads incorporated into at least one face thereof by a first and a second set of needles, said method comprising the steps of: feeding a backing yarn to predetermined needles of said first and second set of needles for stitch formation of the backing fabric, feeding at least one additional yarn to the hooks of knitting and tucking needles of said first set of needles, wherein the backing yarn is fed only to predetermined needles within said first

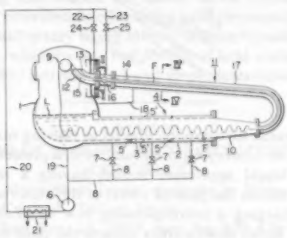


and second set of needles raised into clearing position above the needles of the first needle set which are in tuck position, and wherein the additional yarn is fed to all needles in knitting and tucking position of said first set of needles at the back side opposite to the hook openings of said second set of needles.

4,019,351
APPARATUS FOR FLUID TREATMENT OF A FIBER PRODUCT

Hiroshi Mizutani, Nagashimacho, and Hitoshi Ono, Moriyama, both of Japan, assignors to Nihon Senshoku Kikai Kabushiki Kaisha and Takeni Senka Kabushiki Kaisha, both of, Japan

Filed Aug. 27, 1975, Ser. No. 608,407
Claims priority, application Japan, Sept. 9, 1974, 49-102947
Int. Cl.² D06B 3/28
U.S. Cl. 68—177 1 Claim



1. An apparatus for fluid treatment of a fiber product wherein said fiber product is smoothly circulated in a predetermined direction within said apparatus, which apparatus comprises:

a. a substantially upright cylindrical fiber treatment section having an opening at a side of the lower portion thereof and an opening at a side of the upper portion thereof;
b. a horizontal outer tube connected to said lower opening;
c. a perforated inner tube concentrically provided inside said horizontal outer tube; said perforated inner tube and said horizontal outer tube comprising a fiber residence section;
d. a tube for transferring a fiber product to the terminus of said horizontal outer tube from said opening at the side of the upper portion of said upright cylindrical section;
e. said tube for transferring said fiber product being provided with a treatment fluid jet nozzle for high speed transfer of said fiber product; and
f. a high speed reel in the upper portion of said upright cylindrical section;

the circulation of said fiber product being from:

i. the lower portion of said upright cylindrical section to
ii. the upper portion of said upright cylindrical section to
iii. said transfer tube via said reel to
iv. said fiber residence section and
v. back to said lower portion of said upright section

and wherein an annular space is formed between said horizontal outer tube and said perforated inner tube,

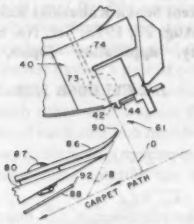
said annular space being divided into a desired number of annular chambers via partition rings provided inside said space perpendicular to the horizontal length of said outer tube, each of said annular chambers having a valved outlet connected to a pump where by opening and closing said valved outlets, the position of said fiber in said residence section can be varied to thereby transfer said fiber through said apparatus smoothly, said pump being in liquid flow communication with said treatment fluid jet nozzle.

4,019,352

APPARATUS FOR THE APPLICATION OF LIQUIDS TO MOVING MATERIALS

John K. McCollough, Jr., and William H. Stewart, Jr., both of Spartanburg, S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Feb. 23, 1976, Ser. No. 660,149
Int. Cl.² D06B 1/02
U.S. Cl. 68—205 R **4 Claims**



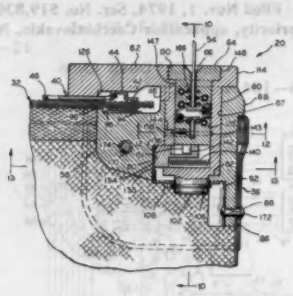
1. Apparatus for applying liquids to moving material including means for conveying the material in a predetermined path of travel, liquid applicator means having a row of outlets positioned above the path of travel of the material for continuously discharging a corresponding row of generally parallel streams of liquid downwardly toward the path of travel of the material, means positioned on one side of said row of outlets so that discharge axes of said means intersect the discharge axes of the outlets for selectively deflecting the streams of liquid from said outlets away from the path of travel of the material, and a liquid collection chamber positioned on the other side of the discharge axes of the row of outlets from said deflecting means, said liquid collection chamber having an opening extending along the row of outlets for receiving the deflected liquid streams to prevent their contact with the moving material, a first liquid collector plate supportably positioned in said opening with an outer edge of the plate extending along the opening and positioned closely adjacent the liquid discharge axes of said outlets to intercept and direct deflected liquid into the collection chamber, a second liquid collector plate positioned in spaced relation below said first collector plate and having an outer edge extending generally parallel to said first collector plate edge but positioned further from said discharge axes than said first collector plate edge for receiving liquid falling from the first plate and directing the liquid into the collection chamber, and a third liquid collector plate positioned in spaced relation below said second collector plate and having an outer edge extending generally parallel to said first and second collector plate edges but positioned further from said liquid discharge axes than said first and second collector plate edges to receive liquid falling from said second collector plate and prevent such liquid from contacting material moving on said path of travel of moving material.

4,019,353

KEEPER LOCK FOR A SLIDE FASTENER

Walter S. Christopher, Park Ridge, Ill., assignor to Chicago Lock Co., Chicago, Ill.

Filed May 15, 1975, Ser. No. 577,655
Int. Cl.² E05B 67/38
U.S. Cl. 70—68 **4 Claims**



1. In a keeper lock for a zipper-type slide fastener having a lacing element, said keeper lock including a barrel having a cylindrical bore and a laterally outwardly projecting rim flange on one end thereof, an anvil fixed to and projecting radially from the barrel and adapted for supporting a fastener lacing element thereon, a cylindrical handle rotatable in the barrel, a keeper arm fixed to and projecting radially from the handle for rotation therewith and adapted to overlie the anvil and a fastener lacing element thereon for retaining the lacing element between the keeper arm and the anvil to prevent operation of the fastener, said keeper arm having a flange extending laterally outwardly from the handle and overlying said rim flange, a lock cylinder rotatable in the handle, tumbler means movable between the lock cylinder and the handle for alternately preventing and enabling rotation of the lock cylinder relative to the handle, a lock bolt mounted in the handle and movable when the keeper arm overlies the anvil between a position locking the handle to the barrel and an unlocking position freeing the handle for rotation, and means coupling the lock cylinder and the lock bolt for moving the bolt between its said positions in response to rotation of the lock cylinder, the combination with means securing said handle substantial axial movement relative to said barrel, a lug integral with the undersurface of said keeper arm flange and with the outer surface of said handle, means defining an arcuate movement path for said lug including an arcuate recess formed in the wall of said barrel bore and bounded by said rim flange, said path being bounded by lug stops for limiting the rotation of said handle, whereby said handle and said keeper arm are limitedly rotatable upon movement of said lock bolt to its unlocking position between said position of the keeper arm overlying the anvil and an out-of-the-way position wherein the lacing element is accessible for manipulation, while each remains substantially in a constant axial disposition relative to said barrel, and means for automatically restoring said lock bolt to its locking position upon rotation of said handle and said keeper arm from said out-of-the-way position of the keeper arm to said anvil-overlying position.

4,019,354

MOTORCYCLE CHAIN LOCK

Marvin O'Dell, Fort Lauderdale, Fla., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Feb. 9, 1976, Ser. No. 656,370
Int. Cl.² B62H 5/06, 5/12
U.S. Cl. 70—236 **3 Claims**

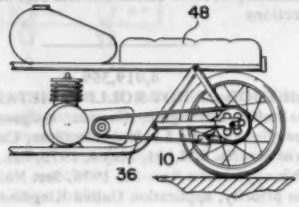
1. A lock designed to engage links of a chain, comprising:

a main body with a transversely extending groove having a square cross-section, open ends and an open bottom;

a flat rectangular plate detachably securable to the bottom

of the body to close off the open bottom of the groove to form a chain receiving channel when the plate is in a closed position attached to the body and to be detached from the body in an open position when the plate is not attached to the body;

first and second like, parallel prongs spaced apart from each other and attached to the plate at their lower ends and extending perpendicularly upwardly away from the plate, the tops of the prongs being enlarged and constituting prong heads, the prongs being so located as to pass transversely through spaces in the chain when the chain is



located in the channel and the plate is in a closed position;

a key-operated tumbler cylinder rotatably secured in the body so as to be rotatable between an open position and a closed position; and

an offset locking arm fixedly secured to the cylinder in a manner that the arm will engage the heads of the prongs to secure the plate to the body when the cylinder is rotated to a closed position and the plate is in a closed position and that the arm will be disengaged from the heads of the prongs when the cylinder is rotated to an open position and the plate is in a closed position.

4,019,355

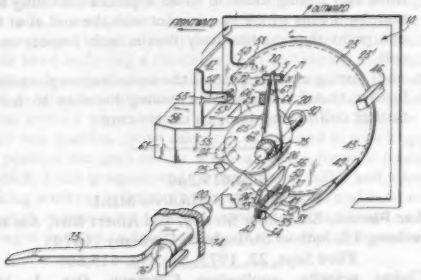
PUSHBUTTON COMBINATION LOCK

Charles E. Germanton, 38 Mountain Ave., Summit, N.J. 07901

Filed Dec. 18, 1975, Ser. No. 642,007

Int. Cl.² E05B *49/02*

U.S. Cl. 70—278 **14 Claims**



1. A combination lock comprising a housing, a bolt selectively retractable within said housing, a rotatable arm for retracting said bolt, a rotatable knob journalled in said housing, a remanent control member within said housing for selectively engaging said arm, said control member being rotatable with said knob, a coil surrounding said remanent control member, a circuit means to selectively energize said coil so as to selectively magnetize said remanent control member, a set of two-state memory elements for storing any one of all combinations of said memory elements, and said circuit means being responsive to signals that correspond to said stored combination for engaging and disengaging said remanent control member and said rotatable arm for selective movement with said remanent control member in order to retract said bolt.

4,019,356

APPARATUS FOR THE COLD WORKING OF BAR STOCK

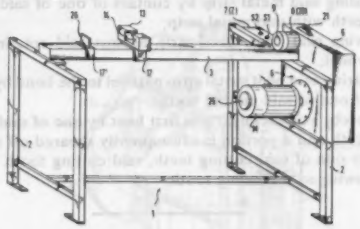
Hans-Erich Bohl, D-3559 Grusen No. 66, Bemunden, Wohra, Germany

Filed July 22, 1975, Ser. No. 598,510

Claims priority, application Germany, July 24, 1974, 2435534

Int. Cl.² B21D *11/14*

U.S. Cl. 72—30 **42 Claims**



1. An apparatus for the cold working of bar stock, comprising a bed support stationary fixing means and comprising rotary fixing means motor-driven via a step-down gear, said stationary and rotary fixing means being aligned and arranged for variable spacing with respect to each other and being provided each with detachable insertion means having a profile matching that of the bar stock to be worked, control means being provided fo effecting a predetermined amount of rotation of said rotary fixing means relative to said stationary fixing means, whereby one bar portion is held stationary while an opposite bar portion is wound in predetermined degree.

4,019,357

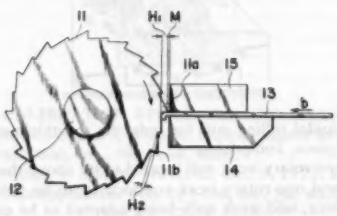
METHOD OF MAKING REINFORCEMENTS FOR CONCRETE

Isao Gokyu, Musashino, Japan, assignor to Nippon Concrete Industries Co. Ltd., Tokyo, Japan

Filed Nov. 10, 1975, Ser. No. 630,626

Int. Cl.² B21D *31/00*

U.S. Cl. 72—130 **6 Claims**



1. A method of making reinforcements for concrete, said reinforcements being cut from an elongated strip of thin metal, comprising the steps of:

rotating a cutter wheel having a circular surface about its rotational axis, said cutter wheel being of finite length and diameter, said cutter wheel including a plurality of cutting teeth extended a first distance from said circular surface of said cutter wheel, and a plurality of bending teeth extended a second distance from said circular surface of said cutter wheel, said second distance being less than said first distance, and said bending teeth and said cutting teeth being aligned parallel to said rotational axis of said

cutter wheel, and said cutting teeth and said bending teeth spaced alternately around said circular surface of said cutter wheel;

supporting said metal strip relative to said cutter wheel on a supporter having a planar supporting surface parallel with said axis of rotation of said cutter wheel, and said supporter positioned apart from said cutter wheel such that the clearance between an adjacent edge of said supporter and a most extended edge of said cutting teeth causes shearing of the metal strip by said cutting teeth when said cutter wheel is rotated and said metal strip bridges said clearance;

moving said metal strip, the width of said metal strip not exceeding said finite length of said cutter wheel, against said rotating cutter wheel with said extended teeth;

bending said metal strip by contact of one of said bending teeth with said metal strip;

moving said bent metal strip against said rotating cutter wheel;

shearing said bent metal strip parallel to the bend by contact of one of said cutting teeth,

whereby said metal strip is first bent by one of said bending teeth and a portion is subsequently sheared off said strip by one of said cutting teeth, said cutting tooth next following said bending tooth.

4,019,358

ROLLING MILL

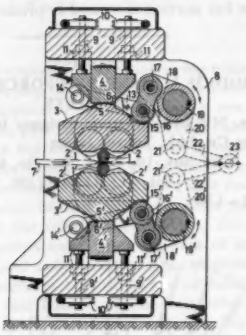
Josef Frühling, Olpe, Biggesee, and Karl Wiedemer, Siegen, both of Germany, assignors to Firm Josef Frohling, Olpe, Biggesee, Germany

Continuation of Ser. No. 468,153, May 8, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,275

Claims priority, application Brazil, May 10, 1973, 3392/73

Int. Cl.² B21B *13/18*

U.S. Cl. 72—189 **31 Claims**



1. A cycloidal rolling mill for reducing the thickness of a metal workpiece, comprising:

at least one rotary work roll located to be above the workpiece and one rotary work roll located to be below the workpiece, said work rolls being adapted to be engaged on the workpiece;

a displaceable carrier associated with each of said work rolls, each displaceable carrier comprising a curved cam surface which faces away from the work roll;

means for supporting said work rolls on said displaceable carriers;

means for moving said displaceable carriers in a forward advance direction and in the opposite direction while said work rolls are simultaneously engaged on the upper and underside surfaces of the workpiece; and

backing members associated with each displaceable carrier for maintaining a predetermined separation between said displaceable carriers to maintain a corresponding predetermined spacing between said work rolls when the workpiece is fed therebetween so that said work rolls are engaged against the workpiece during said forward advance of said displaceable carriers as well as during movement of said displaceable carriers in said opposite direction to perform a rolling operation on the workpiece, each backing member including a counterface on which the cam surface of each displaceable carrier engages, said engaging cam surfaces and said counterfaces being shaped to cause said displaceable carriers with said work rolls supported thereon to follow a path including a cycloidal portion and a rectilinear portion during movement of said displaceable carriers in said forward and opposite directions.

4,019,359

METHOD OF HOT ROLLING METAL STRIP

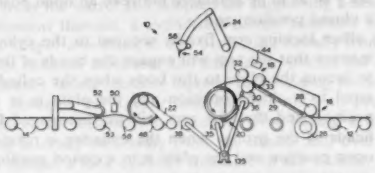
William Smith, Burlington, Canada, assignor to The Steel Company of Canada, Limited, Hamilton, Canada

Division of Ser. No. 574,901, May 6, 1975, Pat. No. 4,005,830. This application Apr. 12, 1976, Ser. No. 676,139

Claims priority, application United Kingdom, May 6, 1974, 19917/74

Int. Cl.² B21B *1/34*

U.S. Cl. 72—231 **6 Claims**



1. In a method of rolling hot metal strip, the steps of:

a. rolling a transfer bar,

b. coiling the transfer bar at a coiling location to form a coil having an open center core,

c. substantially immediately after the coiling step is completed, initiating the uncoiling of said coil at the coiling location and passing the uncoiling transfer bar end toward a finishing operation,

d. while the uncoiling is proceeding, transferring the coil from said coiling location to an adjacent uncoiling location, by means which has contact with the coil at at least one point that continuously moves with respect to the coil,

e. and, during at least part of the uncoiling step, coiling a further transfer bar at said coiling location to form a further coil having an open center core.

4,019,360

WIRE ROD ROLLING MILL

Oskar Biernot, Ensheimer Str. 48, and Albert Bier, Am Klosterhang 15, both of St. Ingbert, Germany (6670)

Filed Sept. 22, 1975, Ser. No. 615,609

Claims priority, application Germany, Oct. 1, 1974, 2446905

Int. Cl.² B21B *35/02*

U.S. Cl. 72—249 **4 Claims**

1. A wire rod mill, comprising:

a plurality of serially arranged roll stands;

at least one lontitudinal main drive shaft, said main drive shaft serving as a common drive shaft for all of said roll stands;

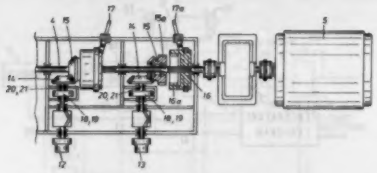
a variable speed drive motor connected to said main drive shaft;

a plurality of transverse shafts, one for each of said roll stands;

first coupling means connecting each transverse shaft with

its associated roll stand for driving said roll stand at a selected speed from said transverse shaft; and

a plurality of second coupling means, one for each transverse shaft, for connecting said transverse shafts with said common main drive shaft in a fixed, predetermined transmission ratio, the second coupling means associated with



the final one of said roll stands in said series, and the second coupling means associated with at least a plurality of roll stands next preceeding said final roll stand, each including means for selectively and individually disconnecting their associated transverse shafts from said common main drive shaft.

4,019,361

MANIPULATOR FOR ROLLING MILL

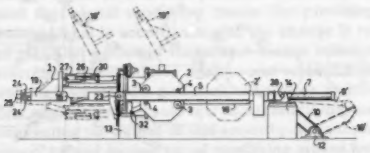
Carl Sebardt, Stockholm, Sweden, assignor to Siftelsen for Metallurgisk Forskning, Lulea, Sweden

Filed Feb. 4, 1976, Ser. No. 655,067

Claims priority, application Sweden, Feb. 13, 1975, 7501630

Int. Cl.² B21B *39/06, 39/30, 39/00*

U.S. Cl. 72—252 **4 Claims**



1. Manipulator for feeding ingots or billets to the roll-nip of the rolls of a rolling mill, comprising support means adapted to be maintained in fixed relation on one side of a pair of cooperable rolls, a manipulator head carried by said support means for movement longitudinally and laterally thereof, said manipulator head including a rotatable head and means for rotating same, grab means adapted to releasably grasp one end of an ingot or billet rotatable with said rotatable head, and a pusher means carried pivotably for pivotal movement between an upper rest position above said grab means and in which upper rest position the grab means is movable to a forward position in which it can grasp an end of the ingot or billet and a lower working position in front of said rotatable head and in front of said grab means so as to be engageable with said one end of the ingot or billet to feed same to the roll-nip of the rolls.

4,019,362

TERMINAL CRIMPING MACHINE

Carl W. McKeever, Kendallville, Ind., assignor to Lyall Electric, Inc., Albion, Ind.

Filed Mar. 17, 1975, Ser. No. 559,336

Int. Cl.² B21D *37/04, 43/04*

U.S. Cl. 72—421 **4 Claims**

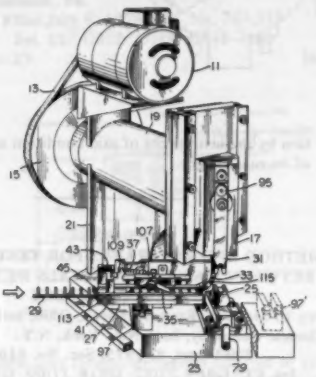
1. A crimping machine for attaching terminals to electrical conductors comprising:

an applicator having a bed and a ram relatively movable together and apart to operate on a workpiece placed therebetween;

first and second cooperating crimping dies operable by relative movement together of the ram and bed to crimp a terminal onto a conductor, the first crimping die being removably attached to the applicator ram and the second crimping die being removably attached to the applicator bed;

terminal feed means removably attached to the applicator and including a reciprocating member for supplying terminals seriatim and in synchronism with the relative movement of the ram and bed, to the region between the ram and bed and only during motion of the reciprocating member in one direction;

flexible, nonelastic tension transmitting means coupling the feed means and applicator to actuate the feed means to supply a terminal to the region between the ram and bed when the ram and bed move apart; and



biasing means opposing operation of the flexible nonelastic tension transmitting means to restore the feed means for subsequent actuation by the flexible nonelastic tension transmitting means, the biasing means including a feed means restoring spring and the flexible nonelastic tension transmitting member interconnecting the ram and the feed means reciprocating member to deform the restoring spring and deliver a terminal when the ram moves away from the bed, the distance moved by the reciprocating member being less than the extent of relative motion between the bed and ram with the flexible nonelastic tension transmitting means going slack between reciprocations of the reciprocating member.

4,019,363

CALIBRATION APPARATUS AND METHOD

Philip Horton Sanford, Walpole, Mass., assignor to Masonellan International, Inc., Norwood, Mass.

Continuation of Ser. No. 401,142, Oct. 9, 1973, abandoned. This application Feb. 5, 1976, Ser. No. 655,483

Int. Cl.² G01F *25/00*

U.S. Cl. 73—1 R **43 Claims**

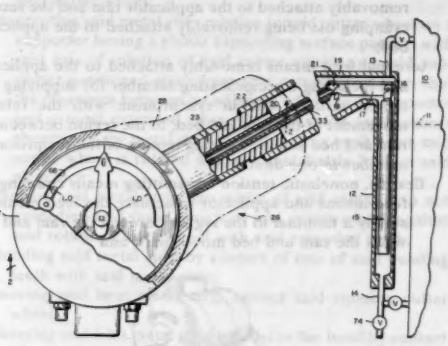
1. The method of calibrating instruments having means for measuring, and means normally loaded by said measuring means for transmitting, changes in a media or process condition across a range of said condition comprising the steps of

establishing the measured condition at the instrument at one limit of said condition range,

adjusting said transmitting means for corresponding indication by the instrument of said condition at said one limit of said condition range,

loading said transmitting means independently of and without affecting said measuring means to inferentially simulate said condition at the other limit of its said range, and

adjusting said transmitting means for corresponding indication by the instrument of said condition at said other limit of its said range.

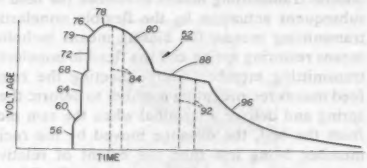


4,019,364

METHOD AND APPARATUS FOR TESTING WELDS BETWEEN DISSIMILAR METALS BY USING THE SEEBECK EFFECT

Harry L. Maddox, Reynoldsburgh, Ohio, assignor to Western Electric Company, Inc., New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 610,964
Int. Cl.² G01N *25/72*; G01R *31/00*; G08B *21/00*
U.S. Cl. 73—15 FD **6 Claims**



1. In a method of testing a weld formed between two dissimilar metals by the application of welding energy to the weld, where an emf is generated across the weld bond interface and has a value related to the temperature of the weld bond interface as a result of the Seebeck effect:

monitoring the emf across the weld as a result of the emf generated across the weld bond interface;

detecting the occurrence of a loss of the monitored emf subsequent to the application of the welding energy to the weld and during the cooling thereof, and

generating an indication of a detected loss of the monitored emf.

4,019,365

THERMOMECHANICAL ANALYZER

Lecon Woo, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

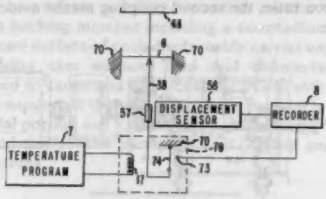
Filed Mar. 4, 1975, Ser. No. 553,453
Int. Cl.² G01N *3/18*
U.S. Cl. 73—15.6 **11 Claims**

1. A mechanical analyzer for measuring stress or tension in a sample material having a modulus of elasticity comprising:

a flat spring having a known modulus of elasticity over the measuring range of said analyzer, said known modulus being greater than said sample modulus,

coupling means for coupling said flat spring and said sample mechanically in parallel such that each are subjected to the same displacement, and

transducer means for sensing said displacement.

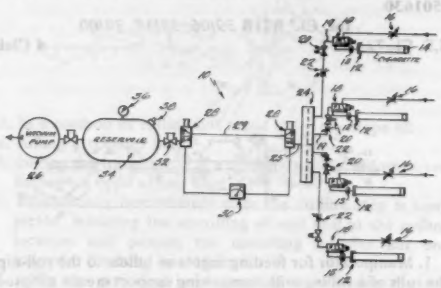


4,019,366

VARIABLE PARAMETER SMOKING MACHINE

Warren E. Claflin, Chesterfield, and Francis M. Watson, III, Richmond, both of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,776
Int. Cl.² G01N *1/26*
U.S. Cl. 73—23 **9 Claims**



1. A smoking machine comprising

a. a plurality of means for holding a cigarette or the like for smoking,

b. a continuous source of vacuum,

c. a plurality of dummy air-flow resistance means, one corresponding to each of said holding means, the air-flow resistance of said dummy means being adjustable to be substantially the same as a cigarette or the like being held by the corresponding holding means,

d. means for operatively connecting said continuous source of vacuum to said plurality of holding means and to said plurality of dummy air-flow resistance means, and

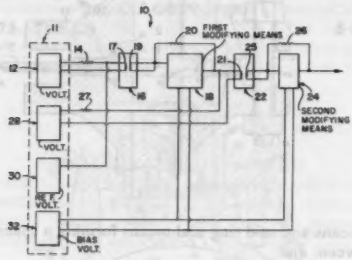
e. a first valve means associated with each holding and disposed in said connecting means for selectively placing each of said holding means in communication with said vacuum source so that air and smoke are drawn through a cigarette in said holding means toward said vacuum source to provide a puff, said valve means in a first position thereof placing said holding means in operative communication with said vacuum source and said dummy means not being in communication with said vacuum source, and in a second position thereof placing said dummy means in operative communication with said vacuum source and said holding means not being in communication with said vacuum source.

4,019,367

LINEARIZED ODOR TRANSDUCER

Ross W. Norsworthy, Largo, Fla., assignor to CRS Industries, Inc., Tampa, Fla.

Filed Sept. 11, 1975, Ser. No. 612,458
Int. Cl.² G01N 27/04
U.S. Cl. 73—23 **6 Claims**



1. A pollutant sensing means for indicating the amount of pollutants in a gas, comprising the combination:

a first and second pollutant transducer means each providing a change in resistance as a function of the concentration of pollutant present in the gas;

a first and a second signal modifying means,

electrical power source means connected to said first and second pollutant transducer means and to said first and second signal modifying means;

reference power source means,

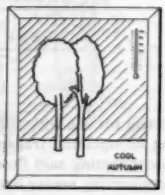
first means connecting said first pollutant transducer means to said reference power source means and connecting the output signal of said first pollutant transducer means to said first signal modifying means for providing a first outout signal in accordance with the change in resistance of said first pollutant transducer means relative to said reference power source means; and second means connecting said second pollutant transducer means to said first output signal of said first signal modifying means and connecting the output of said second pollutant transducer means to said second signal modifying means for providing a second output signal in accordance with the change in resistance of said second pollutant transducer means relative to said first output signal.

4,019,368

PICTORIAL ROOM THERMOMETER

Jose Miguel Antonio Rosario Navato, 938 Brookvale Terrace, Manchester, Mo. 63011

Filed Jan. 8, 1976, Ser. No. 647,009
Int. Cl.² G01N 11/12
U.S. Cl. 73—356 **8 Claims**



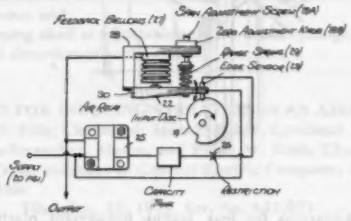
1. A thermometer adapted to be hanged up on walls or stood up on flat surfaces to pictorially and graphically indicate the temperature of the room or environment comprising a substrate on which is painted or printed a design, a black or dark background, an overlay or painted on layer of liquid crystals over designed areas of the picture or painting or the first mentioned design, which liquid crystals change color in response to changes of room or ambient temperature in a predetermined temperature range and causing a change in the color and or shape of the original design, and a standard room thermometer incorporated in the picture or design for more precise temperature determination.

4,019,369

PNEUMATIC TRANSMITTER FOR VARIABLE AREA FLOWMETER

Toshio Satori, Yokohama, Japan, assignor to Fischer & Porter Co., Warminster, Pa.

Filed July 8, 1976, Ser. No. 703,529
Int. Cl.² G01B 13/16; G01F 1/24
U.S. Cl. 73—37 **10 Claims**



1. A variable-area flowmeter system adapted to produce a transmittable pneumatic output that is linearly proportional to fluid flow rate, said system comprising:

A. a variable area tube through which the fluid to be metered is conducted;

B. a float disposed in said tube to be raised and lowered therein as a function of flow rate, and a bar magnet physically coupled to said float and axially movable therewith.

C. a shaft-mounted follower magnet magnetically coupled to the bar magnet whereby the axial movement of the bar magnet is translated into rotary motion.

D. an edge-profiled disc mounted on said shaft, said profile affording a linear relationship between rotation of said disc and the pneumatic output of said system; and

E. means including a pneumatic edge sensor associated with said disc to produce said pneumatic output signal, said edge sensor being constituted by an air jet nozzle to produce an air stream which is picked up by a collector spaced therefrom by a gap in which the edge of the disc is inserted to more or less interrupt the stream in accordance with the profile, said nozzle being cocked relative to the plane of the disc to an extent counteracting the tendency of the stream to rotate the disc.

10. A system adapted to produce a transmittable pneumatic output that is linearly proportional to a process variable, said system comprising:

A. means to rotate a shaft to an angular degree in accordance with said variable;

B. an edge-profiled disc mounted on said shaft, said profile affording a linear relationship between rotation of said disc and the pneumatic output of said system; and

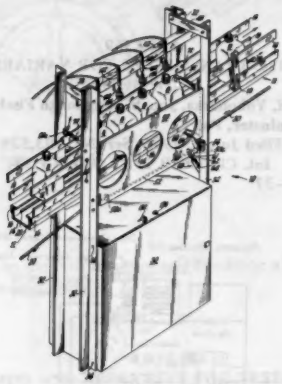
C. means including a pneumatic edge sensor associated with said disc to product said pneumatic output signal, said edge sensor being constituted by an air jet nozzle to produce an air stream which is picked up by a collector spaced therefrom by a gap in which the edge of the disc is inserted to more or less interrupt the stream in accordance with the profile, said nozzle being cocked relative to the plane of the disc to an extend counteracting the tendency of the stream to rotate the disc.

4,019,370

LEAK TESTING DEVICE AND METHOD FOR PLASTIC BOTTLES

Andrew Allocco, Jr., Miami, Fla., assignor to Farm Stores, Inc., Miami, Fla.

Filed Oct. 24, 1975, Ser. No. 625,772
Int. Cl.² G01M 3/32
U.S. Cl. 73—45.1 15 Claims



1. Apparatus for leak testing lightweight plastic bottles comprising:

a. a plurality of test stations each having a retractable head;

b. conveyor means for transporting said bottles through said test stations;

c. means at said test stations for sensing the entrance of bottles into said test stations and generating a command signal when a set of bottles have entered the test station;

d. movable means at the downstream end of said test stations for preventing the exit of said bottles until completion of testing and aligning the bottle mouths in register with said head in response to said command signal;

e. means for moving each of said heads into and out of sealing engagement with its associated bottle leak test means at each test station including:

i. reservoir means for receiving and containing a given volume of pressurized fluid from a source,

ii. control means responsive to said command signal for segregating said reservoir means from said source and placing said reservoir in communication with its associated head, whereby a test pressure-volume relationship is established between the reservoir and bottle, and

iii. means for sensing the pressure of said test pressure-volume relationship and comparing said sensed pressure to a set point value; and

f. ejector means operatively connected to said comparing means for displacing the associated bottle if said sensed pressure is below said set point value.

4,019,371

APPARATUS AND METHOD FOR EXTERNALLY TESTING CONDUIT CONNECTIONS

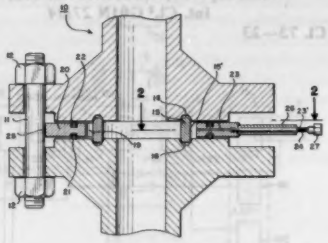
Gervase M. Chaplin, Gretna, and Thomas W. Childers, Mandeville, both of La., assignors to Exxon Production Research Company, Houston, Tex.

Filed Jan. 28, 1976, Ser. No. 652,969
Int. Cl.² G01M 3/28
U.S. Cl. 73—46 19 Claims

1. Apparatus for testing a connection between fluid conducting conduits employing an external source of fluid pressure comprising:

ring seal means in said connection for sealing off and preventing flow of fluids into and from said conduits when said connection is made;

test ring seal means in said connection, said test ring seal



means and said ring seal means forming a space therebetween; and

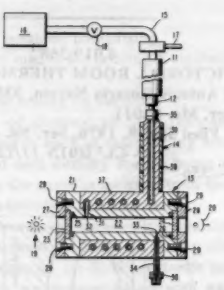
passageway means connecting said space to the exterior of said connection for transmitting fluid pressure from said source of fluid pressure to said space.

4,019,372

CHROMATOGRAPHIC DETECTOR SYSTEM

Erwin C. Parkell, Galena, Md., and John A. Stamm, Wilmington, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 470,635, May 16, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 534,092
Int. Cl.² G01N 31/08
U.S. Cl. 73—61.1 C 5 Claims

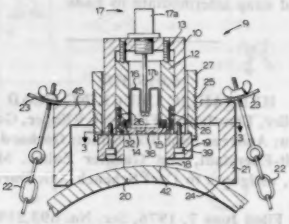


1. A detector system for use with a liquid chromatographic column comprising an optically transparent flow cell and a connecting means connecting said flow cell to the output of said column, said connecting means being a long narrow tube, partially coiled around said flow cell and encapsulated by and connected to said flow cell by a thermally conductive medium, said connecting means being in thermal contact with said flow cell for a sufficient length so that any liquid passing through said connecting means come into thermal equilibrium with said flow cell before entering the optical transparent portion of said flow cell.

4,019,373
ULTRASONIC TRANSDUCER MOUNTING AND COUPLING ASSEMBLY

David Lewis Freeman, Bridgenorth, and Ralph Seymour Flemons, Peterborough, both of Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada

Filed May 28, 1975, Ser. No. 581,636
Claims priority, application Canada, June 17, 1974, 202680
Int. Cl.² G01N 29/00
U.S. Cl. 73—71.5 US 5 Claims

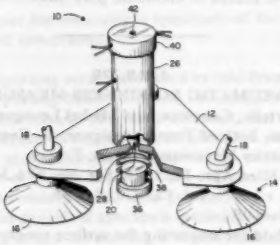


1. A transducer coupling for providing electro-mechanical energy coupling with a pipe, comprising; adjustable mounting means for attaching said coupling to said pipe, having casing means secured thereto in spaced relation from the pipe when installed, a resilient elastomeric coupling member, securing means holding said coupling member is attached relation to the casing means, having an outer end of said coupling member projecting therefrom to contact the surface of said pipe in compressed relation therewith, a transducer having one surface thereof secured in compressed relation against the other end of said coupling member, by way of electrically insulated mounting means, first and second electrical connections to said transducer, said first connection contacting said one surface of the transducer, being held in contacting relation therewith by compressive force acting between said coupling member and said insulated mounting means, said insulated mounting means securing said second connection in resilient contacting relation to a second face of said transducer.

4,019,374
ELECTROMAGNETIC IMPULSER FOR DYNAMICALLY LOADING A STRUCTURE

William S. Tierney, Palos Verdes Peninsula, and James E. Wright, Long Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed July 24, 1975, Ser. No. 598,900
Int. Cl.² B06B 1/04
U.S. Cl. 73—71.5 R 1 Claim

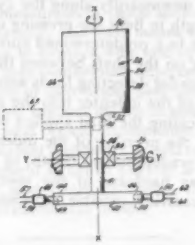


1. An impulser for percussively loading a structure comprising:
- a plate;
- suction cups secured to one side of said plate including means through which said cups may be evacuated to firmly attach said plate to said structure;
- a solenoid mounted on the other side of said plate on a transverse axis of the plate; an anvil at said one side of said plate on the axis of said solenoid for seating against said structure;
- a compression spring securing said anvil to said plate;
- a plunger movable in said solenoid from a normal retracted position through a percussion stroke toward said anvil by electromagnetic action to impact one end of said plunger against said anvil and thereby deliver an impulse to said structure;
- a spring for urging said plunger to its retracted position;
- signal generating means including an axially adjustable timing shaft threaded axially in the other end of said plunger, a light source and a photodetector situated at diametrically opposite sides of said timing shaft in a manner such that said shaft blocks light transmission from said source to said detector in said normal retracted position of said plunger and said timing shaft moves through said percussion, stroke with said plunger and from between said light source and detector to permit light transmission to said detector, whereby the detector generates an electrical signal in timed relation to said impulse; and
- said timing shaft is adjustable relative to said plunger in the axial direction of said plunger.

4,019,375
MEANS FOR INDUCING VIBRATION IN AN AIRFOIL

Delmar H. Ellis, Cincinnati; John E. Baker, Loveland; Wayne M. Shaffernocker, Mason, and Ralph W. Scott, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 22, 1975, Ser. No. 643,077
Int. Cl.² G01M 7/00; G01N 3/32
U.S. Cl. 73—71.5 R 16 Claims



1. An apparatus for inducing vibrations in an airfoil blade extending longitudinally about a first axis and including a pair of generally opposed airfoil surfaces, a leadng and a trailing edge associated with said surfaces, said airfoil surfaces terminating at a pair of end portions each of said portions connecting said one of said pair of surfaces to the other of said pair of surfaces, said end portions disposed at opposite ends of longitudinally extending blade, said apparatus comprising:
- an elongated stem secured at one of its ends to said airfoil blade;
- bearing means receiving said stem for supporting said airfoil blade for rotation siumltaneously about said first axis and about a second axis perpendicualr to said first axis;
- second means operatively connected to one of said end portions and movable about said two axes in response to variations in magnetic flux, said second means operative to pivotally rotate said blade simultaneously about said first and second axes;
- third means responsive to an electrical control signal for generating a variable magnetic flux field, said second means disposed within said magnetic flux field so as to be responsive to variations in said magnetic flux field;
- fourth means for providing said electrical control siganal to said third means.

4,019,376

HARDNESS TESTER

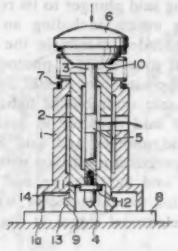
Shozo Iwasaki, Ebina, Japan, assignor to Kabushiki Kaisha Akashi Seisakusho, Japan

Filed Sept. 4, 1975, Ser. No. 610,398

Claims priority, application Japan, Sept. 11, 1974, 49-104672

Int. Cl.² G01N 3/48

U.S. Cl. 73—81 5 Claims



1. A hardness tester, comprising;

a load application shaft having an indenter at a lower end thereof, and having loading means at an upper end thereof for applying variable loads to the shaft to press the indenter into a specimen;

a reference cylinder coaxially fitted around the shaft for sliding of the shaft along the cylinder, the cylinder having a datum plane at a lower end thereof for contacting the specimen at the inception of the applying of a load to the shaft;

stop means on the shaft and cylinder for limiting any sliding of the shaft, downwardly along the cylinder, to a predetermined length to limit the pressing of the indenter into the specimen to a predetermined corresponding depth;

a load detector on the shaft between the indenter and the loading means for detecting loads applied to the shaft by the pressing of the indenter into the specimen; and

means for indicating the load applied to the shaft and detected upon the pressing of the indenter into the specimen to the predetermined depth, to thereby indicate a corresponding hardness of the specimen without any need for measuring variable dimensions of an indentation.

4,019,377

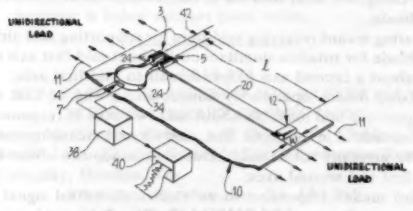
ELASTOMER STRAIN GAGE

Michael A. Rickards, La Jolla, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Mar. 29, 1976, Ser. No. 671,428

Int. Cl.² G01B 7/16

U.S. Cl. 73—88.5 R 6 Claims



1. A temperature compensating strain gage apparatus for measuring surface elongations of an elastomeric material comprising:

an elongated strap of said elastomeric material;

means for attaching one end of said strap to the surface of said elastomeric material;

a first and second strain gage holding means, said first holding means is fixedly attached to the end of said strap remote from said means for attaching and said second holding means fixedly attached to said surface adjacent and spaced from said first holding means;

a strain gage removably secured to said first and second holding means for measuring relative movement therebetween; and

a heat transferring medium positioned between said surface and said strap intermediate its ends.

4,019,378

HYDRAULIC CHUCKING HEAD

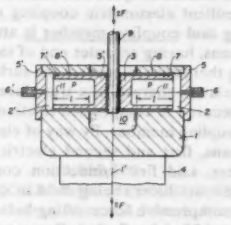
Guenter Keller, Ernsthofen; Friedrich Klinger, Garmisch-Partenkirchen; Andreas Pohl, Darmstadt; Gerhard Schimanski, Darmstadt-Eberstadt, and Guenter Zuber, Messel, all of Germany, assignors to Carl Schenck AG, Darmstadt, Germany

Filed June 7, 1976, Ser. No. 693,519

Claims priority, application Germany, July 5, 1975, 2530132

Int. Cl.² G01N 3/04

U.S. Cl. 73—103 7 Claims



1. A chucking head especially for testing machines to hold a test sample therein, comprising a housing having a first axis, a recess extending coaxially in the direction of said first axis in said housing, at least one second axis in said housing extending at a right angle to said first axis, cylinder bore means in said housing extending along said second axis and having an open end facing into said recess, hollow piston means located in each of said cylinder bore means and facing toward said first axis, and pressure supply means communicating with said cylinder bore means, said hollow piston means being made of elastically yielding material whereby upon application of pressure the piston jackets are pressed against the respective cylinder bore means to eliminate play therebetween.

4,019,379

PNEUMATIC ROUGHNESS MEASURER

Claude Wartelle, Gouvieux, and Michel Leveque, Champigny-sur-Marne, both of France, assignors to Centre Technique des Industries Mecaniques, Senlis, France

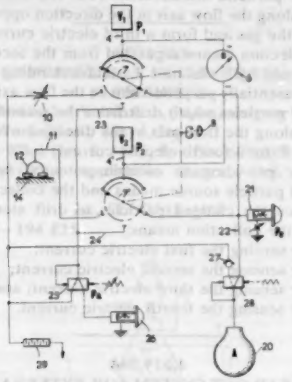
Filed Apr. 12, 1976, Ser. No. 676,341

Int. Cl.² G01B 5/28

U.S. Cl. 73—105 14 Claims

1. A method for measuring the surface roughness of a workpiece, comprising filling two vessels with a compressed gas at specific pressures; disconnecting the vessels from the pressure source, applying to the rough surface of the workpiece to be studied the open end of a bell-form sensor connected to a second one of the vessels; evacuating simultaneously and individually to atmosphere the two vessels, the first through a calibrated throttle, the second through the leak existing between the edge of said sensor bell and the rough surface of the

workpiece; measuring, during evacuation, the difference between the pressures in the two vessels; and deducing from this



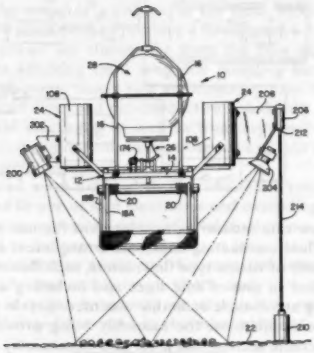
pressure differential, by standardization with sample pieces of known roughness, the roughness of the piece studied.

4,019,380

UNDERWATER SAMPLER

Samuel O. Raymond, Falmouth, Mass., assignor to Benthos, Inc., N. Falmouth, Mass.

Filed Mar. 8, 1976, Ser. No. 664,482
Int. Cl.² G01N 1/00
U.S. Cl. 73—170 A 23 Claims



1. A sampler for obtaining a specimen of the bottom of a body of water comprising;

a frame;

ballast supporting means mounted to said frame for releasably supporting ballast whereby said sampler is caused to sink to the bottom of a body of water;

first and second jaw members mounted on said frame for relative movement between an open position wherein said jaw members are spaced from one another and a closed position wherein said jaw members oppose each other and provide a specimen retaining pocket;

jaw moving means for moving said jaw members relative to one another from said open position to said closed position;

control means for independently initiating operation of said jaw moving means and causing said ballast supporting means to release ballast when said sampler reaches the bottom of a body of water; and

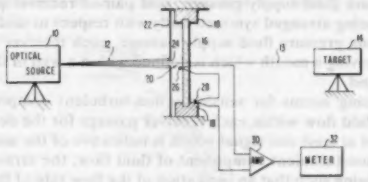
buoyant means on said frame to return the sampler to the surface of the body of water after the ballast is released.

4,019,381

TRANSPARENT OPTICAL POWER METER

Frank J. Elmer, Spring Lake Heights, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 12, 1976, Ser. No. 648,350
Int. Cl.² G01K 17/00
U.S. Cl. 73—190 EW 11 Claims



1. Apparatus for measuring the average power in an optical beam emitted from an optical source, comprising in combination.

an extended area optical transmission means located in the path of said optical beam, said beam passing therethrough from an input face to an output face at a predetermined limited area inner region;

support means of a different material than said optical transmission means in an outer peripheral area of said optical transmission means for supporting said optical transmission means in said beam path;

first and second temperature sensitive means connected in series and being operable to measure the temperature difference existing between an area immediately adjacent said predetermined region through which the beam passes and the temperature of said support means and generating a measurement signal indicative of said temperature difference; said first means being disposed on said input face in contact with said optical transmission means in said area immediately adjacent said inner region out of the path of said beam, said second means being disposed on said support means in said outer peripheral area adjacent said optical transmission means; and

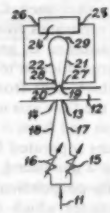
means coupled to and responsive to said temperature difference measurement signal to provide a readout of power remaining in said beam following the beam passage through said transmission means.

4,019,382

APPARATUS FOR USE IN THE MEASUREMENT OF THE FLOW RATE OF FLUID FLOW

Hussein Mokhtar El-Gammal, Hatfield, England, assignor to Ferraris Development and Engineering Company Limited, London, England

Filed Mar. 24, 1975, Ser. No. 561,378
Claims priority, application United Kingdom, Mar. 25, 1974, 13076/74
Int. Cl.² G01F 1/34
U.S. Cl. 73—194 R 8 Claims



1. Apparatus for use in the measurement of the flow rate of a fluid flow, the apparatus comprising:

a body which defines a duct through which the fluid flow to be measured is directed;

at least one pressure fluid supply passage formed in the body in communication with the duct, adapted for connection to a source of fluid pressure and orientated with respect to the duct so that, in use of the apparatus, it directs a jet of fluid under pressure across the duct;

a pair of receiver passages formed in the body and in communication with the duct opposite said at least one pressure fluid supply passage, said pair of receiver passages being arranged symmetrically with respect to said at least one pressure fluid supply passage, each receiver passage having a mouth which is defined within a wall of the duct; and

sensing means for sensing a non-turbulent component of fluid flow within each receiver passage for the derivation of at least one signal which is indicative of the associated non-turbulent component of fluid flow, the arrangement being such that an indication of the flow rate of fluid flow through the duct can be derived from said at least one signal;

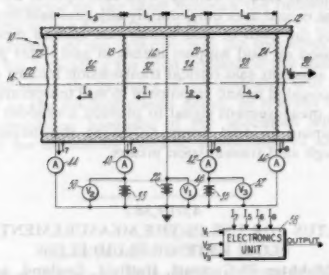
wherein the two receiver passages are connected together so as to define a loop by which said mouths communicate one with the other, the dimensions and configuration of the part of the loop with which said sensing means communicate being such as to ensure that fluid flow therewithin is laminar.

4,019,383

FOUR-COLLECTOR FLUX SENSOR

Walter J. Wiegand, Jr., Glastonbury; Robert H. Bullis, Avon, both of Conn., and Robert J. Mongeon, East Longmeadow, Mass., assignors to United Technologies Corporation, Hartford, Conn.

Filed July 21, 1976, Ser. No. 707,174
Int. Cl.² G01F *1/64*
U.S. Cl. 73—194 F **14 Claims**



1. Apparatus for determining the flux of a gas comprising:

means for providing a region having an axis parallel to which the gas flows at a velocity v_g in passing therethrough;

charged particle source means extending essentially perpendicular to the flow axis to provide charged particles in the gas adjacent to the source means;

first collection means separated from the charged particle source means by a distance L_1 and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the charged particle source means along the flow axis in the direction opposite to the flow of the gas and form a first electric current;

second collection means separated from the charged particle source means by a distance L_2 and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the charged particle source means along the flow axis in the direction of flow of the gas and form a second electric current;

third collection means separated from the first collection means by a distance L_3 and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the first collection means along the flow axis in the direction opposite to the flow of the gas and form a third electric current;

fourth collection means separated from the second collection means by a distance L_4 and extending across the region essentially perpendicular to the flow axis to collect charged particles which drift from the second collection means along the flow axis in the direction of flow of the gas and form a fourth electric current;

means for providing an electric potential between the charged particle source means and the collection means to induce the charged particles to drift along the axis toward the collection means;

means for sensing the first electric current;

means for sensing the second electric current;

means for sensing the third electric current; and

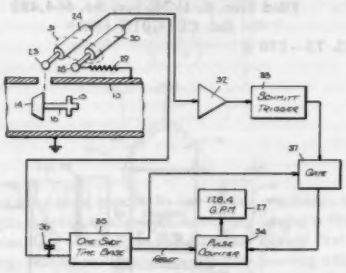
means for sensing the fourth electric current.

4,019,384

DIGITAL READ-OUT SYSTEM FOR EXTERNAL-SENSOR VORTEX FLOWMETER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Continuation-in-part of Ser. No. 445,869, Feb. 26, 1974, Pat. No. 3,946,608. This application Apr. 2, 1976, Ser. No. 673,096
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **14 Claims**



1. A flow rate measuring arrangement for use in conjunction with fluid-conducting lines, said arrangement comprising:

A. a family of vortex-type flowmeters, each flowmeter being installed in one of said lines and including a flow tube having an obstacle assembly mounted therein to produce fluidic oscillations, the assembly being provided with a deflectable section that is set into vibration by said fluidic oscillations, a first external coupling head linked to said deflectable section whereby said vibrations are transmitted thereto, and a second external coupling head connected to an impedance element whose value is determined by the extent to which the meter factor of the flowmeter deviates from a nominal meter factor, whereby the flowmeters in said family carry impedance elements appropriate to their respective meter factors; and

B. a common read-out system for taking a reading from each flowmeter in said family, said system comprising:

a. a sensor engageable with said first head to produce a signal whose frequency corresponds to the vibratory frequency;

b. means coupled to the sensor to convert said signal to pulses having the same frequency;

c. a tip engageable with said second head to effect a connection to said impedance element;

d. means connected to said tip to generate a timing period whose duration depends on the value of said element; and

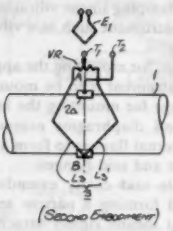
e. a pulse counter to count said pulses during said timing

period to provide a count indicative of the flow rate of the flowmeter being read, which count is corrected for the meter factor of said flowmeter.

4,019,385
NOISE COMPENSATION IN ELECTROMAGNETIC FLOWMETER

Masayasu Watanabe, Yokohama, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Oct. 6, 1975, Ser. No. 620,105
Claims priority, application Japan, Oct. 30, 1974, 49-125937
Int. Cl.² G01F 1/58
U.S. Cl. 73—194 EM **2 Claims**



1. In an electromagnetic flowmeter provided with a flow tube through which there is conducted the fluid to be metered, the tube having a pair of electrodes mounted thereon at diametrically-opposed points along a transverse axis normal to the direction of flow, the flowing fluid intercepting a magnetic field established by diamond-shaped excitation coils, which field is somewhat asymmetrical with respect to said transverse axis, thereby inducing a voltage in the fluid which is transferred to the electrodes to produce a flow signal; a noise-compensating circuit for eliminating from the flow signal noise components resulting from magnetic coupling between the excitation magnetic fluxes and an imaginary loop formed by the signal lead wires and the conductive liquid path extending between said electrodes as well as from asymmetrical eddy currents flowing in regions on opposite sides of said transverse axis, said circuit comprising:

A. two lead wires external to the tube, each connected at one end to one of said electrodes and extending symmetrically on opposite sides of said transverse axis and formed to define a diamond-shaped loop;

B. a potentiometer connected between the other ends of said lead wires and having a slider; and

C. a pair of output terminals, one of which is connected to said slider and the other to the other electrode.

4,019,386
UNITIZED ELECTRODE ASSEMBLY FOR ELECTROMAGNETIC FLOWMETER

Eggert Appel, Dransfeld; Gottfried Geisler, Gottingen, and Albert Seebode, Rosdorf, all of Germany, assignors to Fischer & Porter Co., Warminster, Pa.

Filed Jan. 20, 1976, Ser. No. 650,686
Claims priority, application Germany, Feb. 8, 1975, 2505427
Int. Cl.² G01F 1/58
U.S. Cl. 73—194 EM **5 Claims**

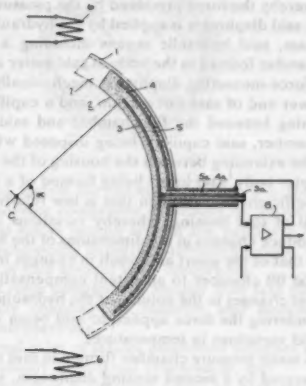
1. In an electromagnetic flowmeter having a dielectrically-lined flow tube through which is conducted the fluid to be metered, said tube having diametrically-opposed openings, the fluid intercepting a magnetic field to induce a signal in the detecting electrodes of a pair of diametrically-disposed unitized electrode assemblies, each assembly comprising:

A. a liner segment having a curvature conforming to the inner contour of the flow tube and formed of rigid homogeneous dielectric material;

B. a planar detector electrode embedded in said segment, said electrode having an arcuate form conforming to the curvature of said segment;

C. a planar shielding electrode embedded in said segment behind said detector electrode and in spaced relation thereto, said shielding electrode having an arcuate form conforming to the curvature of said segment; and

D. a coaxial line extending radially through one of said openings in said flow tube to provide separate electrical connections to said electrodes, said line having an inner

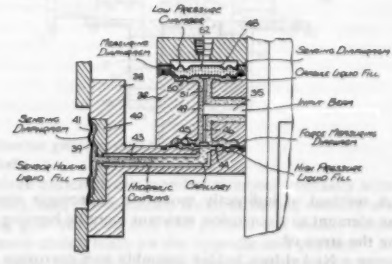


conductor which terminates at and is physically and electrically attached to said detecting electrode and an outer conductor which terminates at and is physically and electrically attached to said shielding electrode, the interior space between the conductors being filled with the same dielectric material as that of said segment and being integral therewith to form a unitized rigid assembly structure which is dimensionally stable, the structure being installable within said tube by inserting the free end of said coaxial line through said one opening.

4,019,387
TEMPERATURE COMPENSATED LIQUID LEVEL TRANSMITTER

William A. Siegel, Norristown, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Apr. 24, 1975, Ser. No. 571,311
Int. Cl.² G01F 23/16
U.S. Cl. 73—299 **3 Claims**



1. In a transmitter for generating a signal proportional to the level of liquid in a tank or other vessel, the combination comprising:

A. a meter having a pivoted force beam and producing an output signal that depends on the force applied to the beam,

B. A sensor for detecting said liquid level and having a housing attachable to the wall of said tank, said housing having a well therein covered by a sensing diaphragm whose face is exposed to the liquid in the tank through an opening in said wall and whose periphery is bonded to the housing, and an insert seated in said well, the face of said insert being spaced from the diaphragm to define a fill chamber containing hydraulic fluid, the volume of hydraulic fluid in said fill chamber varying as a function of temperature,

C. hydraulic means coupling said fill chamber to said beam whereby the force produced by the pressure of the liquid on said diaphragm is applied by the hydraulic fluid to said beam, said hydraulic means including a high-pressure chamber formed in the body of said meter and covered by a force-measuring diaphragm mechanically linked to the lower end of said force beam, and a capillary communicating between the fill chamber and said high-pressure chamber, said capillary being disposed within a support tube extending between the housing of the sensor and the meter body, said insert being formed of a metal having a coefficient of expansion that is low relative to the material of said housing, whereby variations in temperature produce changes in the dimensions of the housing relative to that of the insert and result in changes in the volume of said fill chamber to an extent compensating for concurrent changes in the volume of the hydraulic fluid, thereby rendering the force applied to said beam independent of said variations in temperature,

D. A static pressure chamber formed in said meter body and covered by a second sensing diaphragm, said static pressure chamber and said high-pressure chamber being symmetrically arranged with respect to the force beam, and a second fill chamber extending between said force-measuring diaphram and said second sensing diaphragm,

E. a second measuring diaphragm in parallel relation to said second sensing diaphragm to define a fill space, and

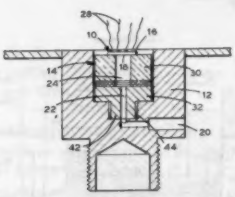
F. a pin linking said second measuring diaphragm to said force beam.

4,019,388

GLASS TO METAL SEAL

George R. Hall, II, Euclid; Jack M. White, Novelty, and Roger L. Krechmery, Mentor, all of Ohio, assignors to Bailey Meter Company, Wickliffe, Ohio

Filed Mar. 11, 1976, Ser. No. 665,828
Int. Cl.² G01L 9/04
U.S. Cl. 73—398 AR 11 Claims



1. A method of indirectly mounting a pressure sensitive Silicon element to a corrosion resistant metallic housing comprising the steps of:

brazing a Nickel-Iron holder assembly to a corrosion resistant metallic stem;

mounting the Silicon element to a glass holder assembly;

soldering the Nickel-Iron holder assembly to the glass holder assembly; and

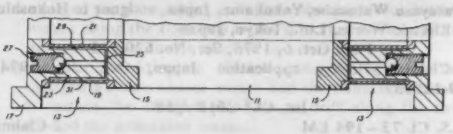
soldering the corrosion resistant stem to the corrosion resistant housing to indirectly mount the Silicon element to the housing.

4,019,389

VISCOUS DAMPER

Jerry Frank LaSala, Pompton Plains, and Walter Joseph Krupick, Succasana, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Feb. 11, 1976, Ser. No. 657,116
Int. Cl.² G01D 11/12; F16F 9/52
U.S. Cl. 73—430 13 Claims



1. Apparatus for damping linear vibrations along an axis to isolate a precision instrument such as a vibrating beam accelerometer comprising:

a. an external flange for mounting the apparatus to the body to which the instrument is to be mounted;

b. an internal flange for mounting the instrument;

c. first and second diaphragms extending between said external and internal flanges to form a cavity bounded by said diaphragms and said flanges;

d. means to divide said cavity extending parallel to said diaphragms and forming a narrow space adjacent each diaphragm, said means rigidly attached to one of said external and internal flanges;

e. a single gap coupling the spaces adjacent said first and second diaphragms at the other of said external and internal flange to which said means to divide are not attached; and

f. a damping fluid filling said narrow spaces and said gap.

4,019,390

SYSTEM AND METHOD FOR COMPLETE ON LINE TESTING OF A MECHANICAL OVERSPEED TRIP CHANNEL ASSOCIATED WITH AN ELECTROHYDRAULIC EMERGENCY TRIP SYSTEM FOR A TURBINE POWER PLANT

Millard F. Smith, Westown; Frederick J. Behringer, Middletown; John R. Doyle, Collingdale, and Daniel P. McFadden, East Goshen, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 22, 1976, Ser. No. 679,294
Int. Cl.² F01K 13/02
U.S. Cl. 73—432 R 6 Claims

1. On line testing apparatus for an emergency trip system of a turbine power plant, the latter including a channel to drain for hydraulic fluid, a normally closed valve therein, means for maintaining under fluid pressure the valve closed under normal operating conditions of the turbine and means for releasing such pressure to open the valve upon the occurrence of a contingency indicative of an unsafe turbine operating condition, the testing apparatus comprising:

a source of hydraulic fluid maintained at a pressure distinct from the pressure in the channel,

means defining a flow path from said source to said channel for conveying fluid under pressure from said source to a point of intersection with said channel,

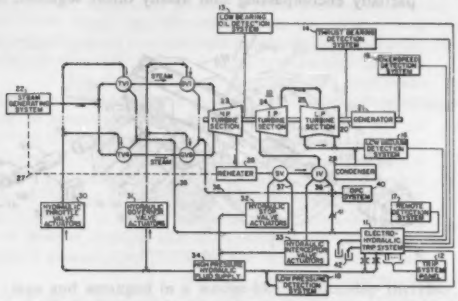
means at said point of intersection controllably operable to obstruct the channel for providing isolation of an upstream portion thereof from a downstream portion thereof while establishing a flow of fluid from said flow path into said downstream portion,

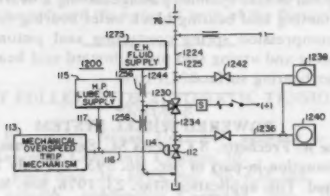
means interconnecting said upstream and downstream portions for maintaining fluid communication therebetween,

first means associated with said interconnecting means of sensing a predefined differential pressure between said upstream and downstream portions of the channel,

second means associated with said interconnecting means in said downstream portion for sensing a reduction in pressure below a predetermined value, and

means for monitoring the test from initiation to completion thereof having a first element associated with said first sensing means for providing verification of the isolation of the downstream portion of the channel from the upstream portion thereof and a second element associated with said second sensing means for providing verification of opening of the downstream portion to drain upon release of the pressure maintaining the valve in its normally closed position.

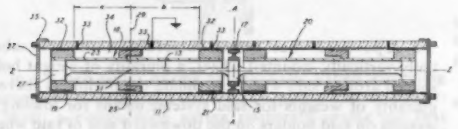




4,019,391
VIBRATORY GYROSCOPE

Bo Hans Gunnar Ljung, Wayne, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed July 25, 1975, Ser. No. 599,126
Int. Cl.² G01C 19/56
U.S. Cl. 73—505 36 Claims



1. A vibrating gyroscope comprising:

a. an elogated hollow casing having a longitudinal axis, said casing having an inside perimeter;

b. first and second vibrating assemblies each comprising:

1. a support tube having an outside perimeter less than the inside perimeter of said casing;

2. a first inertial weight on one end of said tube; and

3. a second inertial weight on the other end of said tube;

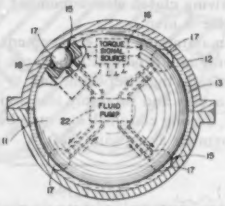
c. first and second flexures disposed between the outside perimeter of the support tubes of said first and second vibrating assemblies respectively and the inside perimeter of said casing supporting said first and second vibrating assemblies symmetrically along said longitudinal axis within said casing such that said one end of said first assembly lies next to said one end of said second assembly; and

d. an elongated flexible rod lying on said longitudinal axis coupling said first and second vibrating assemblies to each other.

4,019,392
TORQUING SYSTEM FOR STABILIZING INERTIAL PLATFORMS

Napoleon Leon Zamfirescu, Torrance, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 14, 1975, Ser. No. 621,965
Int. Cl.² G01C 19/28
U.S. Cl. 74—5 R 5 Claims



1. A torquing system for inertially stabilizing a spherical platform in a housing comprising a plurality of torquer units having spherical rotors spaced around the periphery of said platform for mechanically imparting stabilizing torques to said platform, each of said torquer units comprising:

a ball shaped rotor substantially smaller than said platform mechanically coupling the platform and housing and mounted therebetween,

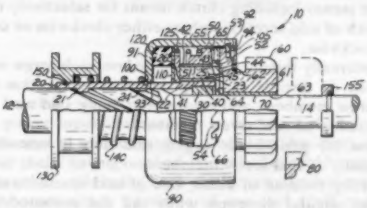
first and second pairs of stators positioned adjacent to said rotor in mutually orthogonal relationship, and

means for providing a torquing signal to said stators in accordance with a platform stabilizing signal to effect magnetic torquing of said rotors, thereby causing said rotors to mechanically torque the platform in response to the stabilizing signals, there being an effective step down gear ratio provided between the rotation of said rotors and the rotation of the platform resulting therefrom.

4,019,393
ENGINE STARTER GEARING

Harold Richard Mortensen, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed Jan. 12, 1976, Ser. No. 648,441
Int. Cl.² F02N 15/06
U.S. Cl. 74—6 18 Claims



1. Starter gearing comprising:

a shaft;

a driven clutch sleeve member mounted coaxially with said shaft, said driven clutch member having radially extending gear teeth on one end portion and axially extending dentil clutch teeth on the opposite end portion;

a driving clutch sleeve member mounted adjacent said driven clutch sleeve member, said driving clutch member havine one end portion and an opposite end portion, said one end portion having axially extending clutch teeth, said clutch teeth being inclined torque transmitting dentil teeth mutually engageable with said dentil clutch teeth of the driven clutch sleeve member for transmitting torque between said driven and driving clutch sleeve members;

a third sleeve member coaxially disposed with said driving

clutch sleeve member, said third sleeve member having one end portion and an opposite end portion, said third sleeve member further comprising:

means for permitting axial movement of said third sleeve member with respect to said shaft;

means for limiting axial movement of said third sleeve member with respect to said shaft; and

means for permitting axial and rotatable movement of said driving clutch sleeve member with respect to said third sleeve member;

means for maintaining into engagement the clutch teeth of said driving and driven clutch sleeve members for transmitting torque therebetween; and

means for axially and rotatably translating said third sleeve member, driving clutch sleeve member and driven clutch sleeve member along said shaft.

4,019,394

DRIVE DEVICE FOR CLAMP HOLDER CARRIAGES OF A CONTINUOUSLY OPERATING PILGER MILL

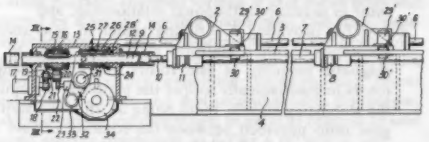
Pierre Peytavin, Neuilly-sur-Seine, France, assignor to Vallourec, Paris, France

Filed May 20, 1974, Ser. No. 471,833

Claims priority, application France, May 24, 1973, 73.18908

Int. Cl.² F16H 21/02

U.S. Cl. 74—27 **7 Claims**



1. Drive device for clamp holder carriages of a pilger rolling mill, said device comprising

slides parallel to the rolling axis of the mill and on which said carriages are slidably mounted,

a pair of rotatable screw members mounted for axial movement parallel to said slides, with each screw member having a threaded portion.

means for attaching each of said carriages to one of said screw members of axial movement therewith,

drive means including clutch means for selectively rotating each of said screw members either clockwise or counterclockwise,

an internally threaded nut mounted on each screw member with its threads engaging the threaded portion of said screw members, and means restraining said nuts against rotation on said screw members,

means for periodically urging said nuts in one direction axially of said screw members,

whereby rotation of either one of said screw members in one angular direction while the nut mounted on said screw member is being urged in said one axial direction will advance the carriage attached to said one screw member in said one axial direction and whereby rotation of either one of said screw members in the opposite angular direction will move the carriage attached to said screw member in the opposite axial direction.

4,019,395

PISTON DRIVE ASSEMBLY

William D. Vork, Edina, and William Clements, Deephaven, both of Minn., assignors to Graco Inc., Minneapolis, Minn.

Filed July 7, 1975, Ser. No. 593,449

Int. Cl.² F16H 21/18

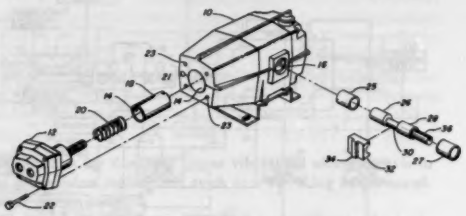
U.S. Cl. 74—49 **13 Claims**

1. Apparatus for providing a reciprocating drive motion for a rotating shaft mounted in a housing, comprising:

a. a portion of said shaft having an axially offset segment of predetermined diameter;

b. a cylinder passage in said housing in perpendicular alignment with said axially offset segment;

c. a bearing block having a bearing surface mating and partially encompassing said axially offset segment, and



having an outer bearing surface with a guide member aligned transverse said shaft axial direction;

d. a piston in said cylinder passage having a bearing surface contacting said bearing block outer bearing surface; and

e. a compression spring contacting said piston and said housing and urging said piston toward said bearing block outer bearing surface.

4,019,396

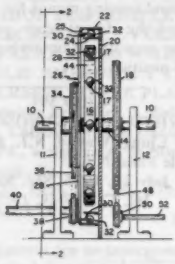
POWERED WHEEL SYSTEM

Alphonse A. Frechette, 8 Cypress St., Salem, Mass. 01970

Continuation-in-part of Ser. No. 593,723, July 7, 1975, abandoned. This application Mar. 23, 1976, Ser. No. 669,633

Int. Cl.² F16H 21/12

U.S. Cl. 74—63 **15 Claims**



1. A powered wheel system comprising a rotatable substantially vertically mounted wheel, a plurality of weight holders spaced around said wheel proximate the periphery thereof; a plurality of weights for said system; means for loading said weights on said holders on the downward side of said wheel at least proximate the top portion thereof to rotate said wheel in a desired direction; means for unloading said weights from said holders at least proximate the bottom portion of said wheel and lifting means for transporting in the same direction the so-unloaded weights back to the top portion of said wheel for reloading onto said holders such that said wheel is driven by the so-applied weights.

4,019,397

BELT DRIVE MECHANISM

John Bochan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Oct. 6, 1975, Ser. No. 619,692

Int. Cl.² F16H 7/00, 7/12, 7/10

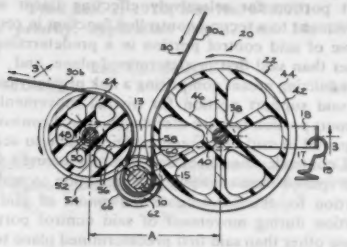
U.S. Cl. 74—227 **12 Claims**

1. In a belt drive mechanism for transmitting torque between a driving rotatable member and a driven rotatable member through a drive belt, a belt tensioner comprising:

a pulley assembly pivotable about the driving member as a

center and including two pulleys with outside diameter flanges, reduced interior diameters, and having their longitudinal axes of rotation parallel and spaced a fixed distance apart; the driving member having its longitudinal axis of rotation parallel to the rotational axes of the pulleys and arranged in a wedge-like relationship therebetween, the flanges of each pulley being in contact with the driving member; and

the drive belt passing over the driving member and then over the reduced diameter of both of the flanged pulleys.



4,019,398

V-BELT PULLEY WITH AUTOMATIC TENSIONING DEVICE

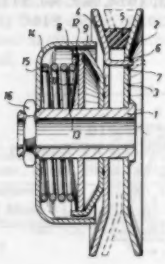
Reinhard Wesemeier, Neuss, Germany, assignor to International Harvester Company, Chicago, Ill.

Filed Nov. 26, 1975, Ser. No. 635,566

Claims priority, application Germany, Nov. 29, 1974, 2456553

Int. Cl.² F16H *9/00, 9/12, 7/08*

U.S. Cl. 74—230.17 C **7 Claims**



1. In a V-belt pulley having an automatic V-belt tensioning arrangement comprising a shaft, a first pulley half carried on the shaft, a compression spring resiliently urging the first pulley half axially along the shaft towards a second pulley half fixed to the shaft, key means drivingly connecting the pulley halves and a means between the spring and the first pulley half for permitting expansion of the spring and limiting the axial movement of the first pulley half to only one direction.

4,019,399

ENDLESS POWER TRANSMISSION BELT

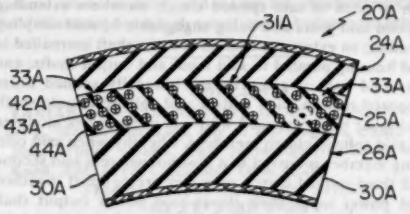
Dale L. Waugh, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed Jan. 21, 1976, Ser. No. 651,375

Int. Cl.² F16G *1/28, 5/00, 1/00;* **B29H** *7/00*

U.S. Cl. 74—231 C **19 Claims**

1. An endless power transmission belt made primarily of elastomeric material and being adapted to be operated in an endless path with said belt comprising, a tension section, a load-carrying section including load-carrying means, and a compression section having a plurality of teeth arranged transverse said endless path, said belt having a central portion and opposed non-parallel sides, said belt including all of its sections and teeth having an arched cross-sectional configuration under no load, said arched configuration and teeth providing optimum transverse rigidity and a non-dished cross-sectional configuration under load, said load-carrying means having a comparatively high concentration thereof adjacent said opposed sides where the load concentration is greatest under load and said load-carrying means have a comparatively low concentration thereof at said central portion.



4,019,400

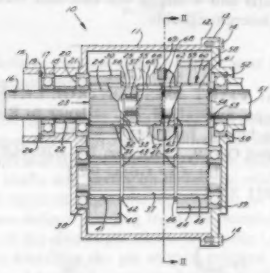
AUXILIARY TWO-SPEED TRANSMISSION

James M. Stump, 8642 E. Main St., Galesburg, Mich. 49053

Continuation of Ser. No. 533,137, Dec. 16, 1974, abandoned, which is a continuation of Ser. No. 341,958, March 16, 1973, abandoned. This application Aug. 28, 1975, Ser. No. 608,555

Int. Cl.² F16H *3/08*

U.S. Cl. 74—333 **3 Claims**



1. In a transmission comprising:

1. a housing,
2. a power input shaft and a power output shaft rotatably mounted in said housing in coaxial arrangement, each of said shafts having one end journalled in said housing, and the other ends being both axially coextensive and mutually constrained, by virtue of one said shaft end being rotatably journalled within the other said shaft end,
3. a first externally splined clutch member affixed to one of said shafts,
4. a second externally splined clutch member freely rotatably mounted over the other of said shafts,
5. a third externally splined clutch member affixed to said shaft having said second clutch member freely rotatably mounted thereon and positioned intermediate and adjacent said first two splined clutch members, said splined clutch members being characterized by a number of equally spaced grooves cut in the clutch member so as to form a series of projecting keys,
6. a coupling member having an internally splined bore having a spline configuration complementary to the spline configuration of said clutch members and being mounted on said third splined clutch member and adapted to slide axially thereon and to couple said third

splined clutch member alternatively to said first or second splined clutch member,

7. means for moving said coupling member axially,

8. a gear train comprising a pair of gears having internally splined bores mounted one on a portion of each of said first and second splined clutch members, a further portion of each of said splined clutch members extending beyond said gears and being engageable by said coupling member; an externally splined counter shaft journalled in said housing parallel to said input and output shafts; and a second pair of gears having internally splined bores mounted one on each end of said splined countershaft, each gear being engaged with one of the gears mounted on said splined clutch members, whereby when said coupling member is moved to a position wherein said second and third splined clutch members are coupled together, said power input shaft drives said power output shaft through said countershaft and associated gears at a rotative speed determined by the relationship of said gears, and whereby when said coupling member is moved to the other position coupling said first and third splined clutch members together, said power input shaft directly drives said power output shaft at the same rotative speed as that of said power input shaft;

the improvement in which the splined clutch members and the splined bores of said coupling member and said pair of gears all have the same diameter and spline configuration, so that each gear fits all of the splined clutch members, and in which the splined countershaft and the splined bores of the second pair of gears have the same diameter and spline configuration as the splined clutch members and the splined bores of the first pair of gears, whereby in dissembling the transmission, said gears can be removed off the said other ends of said input and output shafts and whereby the first and second pairs of gears are interchangeable.

4,019,401

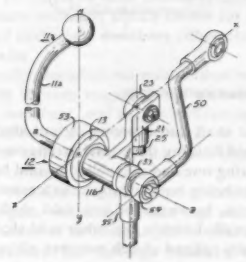
DUAL PIVOT AXIS CONTROL LEVER

Gary Alan Drone, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Oct. 9, 1975, Ser. No. 620,965

Int. Cl.² G05G *9/02*

U.S. Cl. 74—471 XY **10 Claims**



1. A uni-lever control mechanism for selectively operating multiple actuators comprising

a lever having a control portion for effecting movement thereof, said control portion selectively movable in predetermined planes, and a support portion operatively connected to said multiple actuators for controlling the actuation thereof in response to movement of said control portion in said predetermined planes,

universal pivot means supported by said lever between said control portion and said support portion for effecting multi-planar movement of said control portion,

stabilizing means connected to said support portion for stabilizing the movement thereof during multi-planar movement of said control portion,

first actuator means operatively connected to said support portion for selectively effecting linear actuating movement to a first controlled function in response to movement of said control portion in a first predetermined plane,

second actuator means operatively connected to said support portion for selectively effecting linear actuating movement to a second controlled function in response to move of said control portion in a predetermined plane other than said first predetermined plane, and

said stabilizing means comprising a link pivotally connected to said support portion for pivotal movement of said support portion relative thereto when said control portion is moved in said first predetermined plane to actuate the first controlled function, and pivotally secured at a position spaced from said pivotal connection to said support portion to stabilize arcuate movement of said support portion during movement of said control portion in a plane other than said first predetermined plane to actuate the second controlled function.

4,019,402

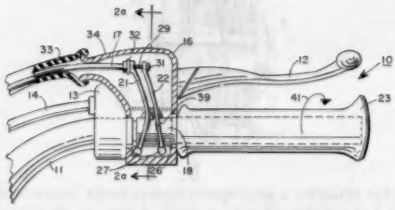
MOTORCYCLE THROTTLE TWIST-GRIP CONTROL

William Henry Leonheart, San Carlos, Calif., assignor to William Henry Leonheart, San Carlos, Calif.

Filed Oct. 3, 1974, Ser. No. 511,946

Int. Cl.² G05G *11/00*; F16C *1/12*

U.S. Cl. 74—489 **8 Claims**



1. In a remote control actuator serving to translate rotational angular movement to linear movement, the combination comprising a base member, at least one lever arm pivotally mounted with respect to said base member, a rotatable member arranged for rotational movement about an axis of about 90° with respect to said base member, cam means movable with said rotatable member and having a rise in cam profile at least equal to the desired length of linear movement, said cam means being arranged to urge said lever arm to pivot with respect to said base as said rotatable member is moved, control actuator cable means including an inner cable member slidably movable with respect to a co-axially arranged outer cable member, one of said cable members being anchored upon and movable with said lever arm, and means independent of said one lever arm,

operative to oppose the movement of the other one of said cable members when said first mentioned cable member is moved by said lever arm permitting relative movement between said cable members as said first cable member is shifted in response to movement of said lever arm by said cam means.

4,019,403
SHOCK ABSORBING TYPE STEERING DEVICE

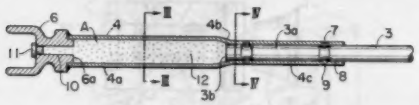
Takeo Kondo, Toyota; Yoichi Hyodo, Takahama; Hiroyuki Ono, Anjo, and Shiro Yuasa, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Aisin Seiki Kabushiki Kaisha, Kariya, both of, Japan

Filed Jan. 2, 1976, Ser. No. 646,071

Claims priority, application Japan, Jan. 14, 1975, 50-6688[U]

Int. Cl.² B62D 1/18

U.S. Cl. 74—492 11 Claims



1. A shock absorbing type steering device for transmitting torque from a steering wheel to a steering gear in a motor vehicle, comprising:

a. a solid, axially straight shaft, an end portion thereof having a non-circular cross-section;

b. a hollow shaft, a first portion of said hollow shaft having a cross-sectional shape substantially conforming to the cross-sectional shape of the non-circular portion of said solid shaft for mating said shafts and forming a steering column and a second portion of said hollow shaft having a cross-sectional area greater than the cross-sectional area of the first portion of said hollow shaft;

c. shear pins interconnecting the non-circular portion of said solid shaft with the first portion of said hollow shaft;

d. a bracket for joining said steering column to said steering gear;

e. a rupturable, resilient, shock absorbing material contained within said second portion of said hollow shaft; and

f. a passageway between the interior of the second portion of said hollow shaft and the atmosphere for ejection of said material.

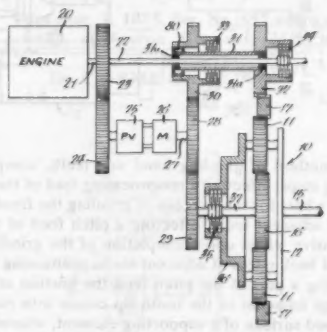
4,019,404
POWER TRANSMISSION

George A. Schauer, Ames, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 21, 1975, Ser. No. 560,998

Int. Cl.² F16H 47/04

U.S. Cl. 74—687 21 Claims



1. A continuously variable power transmission utilizing a differential unit having a ring gear, a sun gear, and a carrier connected to the output of the transmission, a power input shaft, a variable speed hydrostatic transmission driven by said power input shaft and rotatively fixed to one of said gears, and means for controlling the drive relation between said differential gears including means for selective connection of the hydrostatic transmission to the other of said differential unit gears to provide a low-speed range hydrostatic drive, means for selectively connecting the power input shaft to the other of said differential unit gears for an intermediate speed range hydromechanical drive, and means for selectively locking up the differential for a high-speed range hydrostatic drive.

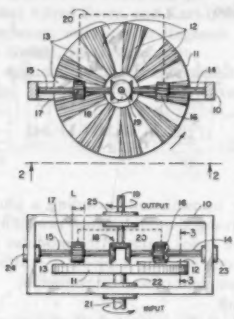
4,019,405
VARIABLE SPEED POSITIVE GEAR TRANSMISSION

Carl E. Winter, deceased, late of Los Angeles, Calif., and by Julia Winter Cohen, legal representative, 2444 Madison Road, Apt. 1210, Cincinnati, Ohio 45208

Filed Jan. 16, 1975, Ser. No. 541,385

Int. Cl.² F16H 37/05

U.S. Cl. 74—691 4 Claims



1. An infinitely variable speed positive gear to gear contact transmission including:

a. a frame;

b. an input shaft bearingly supported in said frame;

c. an output shaft bearingly supported in said frame;

d. a flat circular disc mounted on one of said input and said output shafts and having on its face an odd number of pie shaped toothed segments upon each of which parallel teeth are defined running from the periphery towards the center of the disc in parallel relationship to a diameter of the disc bisecting the pie shaped toothed seegment, said pie shaped toothed segments being equally circumferentially spaced about the disc face to define an odd number of pie shaped blank segments therebetween such that there is always a blank segment directly diametrically opposite a toothed segment;

e. first and second coaxially alligned shafts individually bearingly supported by said frame in a position over said face of said disc in alignment with a diameter of the disc when viewed in plan;

f. first and second pinion gears mounted on said first and second coaxially aligned shafts respectively and keyed to the shafts for slidable movement along the shafts, said pinion gears being equally radially spaced outwardly from the center of the disc, one pinion gear being in threaded meshing engagement with a toothed segment whenever the other is out of engagement with any toothed segment as a result of the presence of a blank segment thereunder, by virtue of which there is continuous meshing engagement between selective ones of said pinion gears and said flat circular disc;

g. means to adjust the radial distance of said pinion gears from the center of the disc to thereby adjust the ratio of the speed between the input and output shafts;

h. and central gear means mounted on the other of said input and said output shafts and intercoupling the inner opposed ends of the said first and second coaxially

aligned shafts which are rotatable in opposite directions about their common axis so that when said first and second pinion gears alternatively rotate in opposite directions said central gear means rotates continuously in one direction, said central gear means being disposed over the center of the face of said disc when viewed in plan;

by virtue of all of which rotation of said input shaft effects rotation of said output shaft regardless of whether said pinion gears drive said disc or said disc drives said pinion gears.

4,019,406

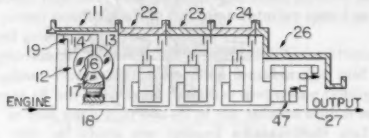
MODULAR POWER TRANSMISSION WITH SELF-ENERGIZING CLUTCH

Charles H. Herr, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 459,109, April 8, 1974, Pat. No. 3,916,729. This application Aug. 20, 1975, Ser. No. 606,151

Int. Cl.² F16H *57/10, 3/44*

U.S. Cl. 74—766 **5 Claims**



1. A power transmission including a plurality of similar, sequentially arranged modules each providing both direct and reduction drive ratios, each of the modules comprising

a fixed housing forming a modular portion of the housing for the complete power transmission,

an input shaft,

an output shaft, the output shaft of each module within the sequence being coupled with the input shaft of the next succeeding module,

a planetary gear set having a sun gear, a ring gear and a plurality of planetary gears mounted upon a rotatable carrier and engaged with the ring gear and the sun gear, the input shaft being coupled for rotation with the ring gear and the output shaft being coupled for rotation with the carrier,

a reduction brake for selectively locking the sun gear against rotation,

a direct drive clutch selectively engageable for causing rotation of the ring gear together with the sun gear,

a source of signal fluid under pressure,

means for operating both the direct drive clutch and reduction clutch in response to a single fluid pressure signal, and further comprising

means securing the fixed housing of the modules together to form an enclosure for the complete power transmission and to assure proper engagement between the output shaft and input shaft for adjacent power transmission modules,

a common center shaft extending through the plurality of similar sequentially arranged modules and supporting the planetary gear set of each sequential module, and

each of the modular housing portions being penetrated by a passage formed in the lower portion of the housing, the passages of the assembled modular housing providing a common sump for the complete transmission.

4,019,407

SAW CHAIN GRINDER FIXTURE

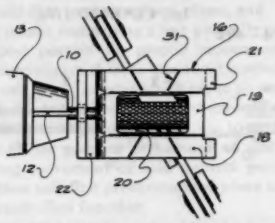
Robert J. Penberthy, Gladstone, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.

Filed Oct. 29, 1975, Ser. No. 626,839

Int. Cl.² B23D *63/16;* **B24B** *23/02*

U.S. Cl. 76—37 **7 Claims**

1. A saw chain grinder fixture comprising; a rod, one end of the rod adapted to be fixed to the chuck of a power tool for rotatively driving the rod, a grinding portion on the rod adapted when rotatively driven to grind the cutting edge of a cutting link of a saw chain; a guide fixture including a reference portion nd a depending guide portion having a guide opening, said reference portion having a central opening and guide surfaces on each side of the opening adapted to rest



respectively on the top plate and depth gauge of the cutting link, and said rod inserted into said guide opening of said depending guide portion to position the rod axially along the guide fixture, and means fixing the axial position of the rod relative to the guide fixture to position the grinding portion of the rod in the opening of the guide fixture and relative to the guide surfaces for proper sharpening of the cutting edge as the rod is rotatively driven.

4,019,408

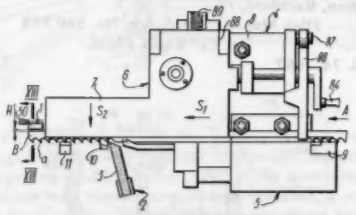
METHOD OF GRINDING BAND SAW TEETH

Vladimir Viktorovich Idel, ulitsa Gertsena, 3, kv. 37, Zavolzhie Gorkovskoi oblasti, U.S.S.R.

Division of Ser. No. 531,722, Dec. 11, 1974, Pat. No. 3,918,130. This application Jan. 27, 1976, Ser. No. 652,890

Int. Cl.² B23D *63/12;* **B24B** *1/00*

U.S. Cl. 76—112 **1 Claim**

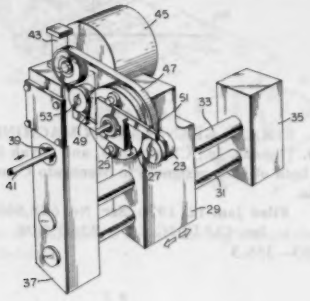


1. A method of grinding band saw teeth, comprising the following steps: effecting a reciprocating feed of the saw to an abrasive wheel for the purpose of grinding the front and back edges of adjacent teeth; effecting a pitch feed of the saw to said abrasive wheel upon completion of the grinding of said front and back edges of adjacent teeth; positioning the saw so that during a part of the pitch feed the portion of the tooth back edge adjacent to the tooth tip comes into contact with one shaped surface of a supporting element, whereby the saw is retarded and at the same time said portion of the tooth edge is strengthened and planished, and during the remaining part of the pitch feed making the portion of the tooth front edge adjacent to the tooth tip contact the other shaped surface of said supporting element, whereby said portion of the tooth front edge is strengthed and planished.

4,019,409
STRIPPING AND DEFILLERING METHOD AND APPARATUS

Carl William McKeever, Kendallville, Ind., assignor to Lyall Electric, Inc., Albion, Ind.

Filed Aug. 4, 1975, Ser. No. 601,473
Int. Cl.² H02G 1/12
U.S. Cl. 81—9.51 10 Claims



1. Apparatus for performing an operation on electrical cable comprising:

a head selectively rotatable about an axis;

at least one pivotable element pivotably supported on the head at a first location spaced from the axis;

at least another pivotable element pivotably supported on the head at a second location spaced from the axis and spaced axially from the first location;

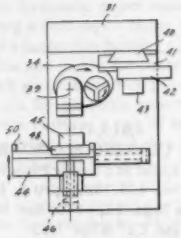
means for urging each pivotable element away from the axis; and

the center of mass of each pivotable element disposed relative to the respective pivot support location so that rotation of the head about the axis urges a portion of each pivotable element toward the axis and into working engagement with a cable, the portion of the one pivotable element for engaging the cable comprising a cutter for substantially severing cable insulation and the portion of the another pivotable element for engaging the cable comprising means for twisting the conductor strands near one end of the cable.

4,019,410
ROTARY SUPPORT FOR USE IN A MACHINE TOOL

Rudolf Staszkiewicz, Kapellenstrasse 57, 62 Wiesbaden, Germany

Filed Mar. 7, 1975, Ser. No. 557,608
Claims priority, application Germany, Mar. 8, 1974, 2411059
Int. Cl.² B23B 13/02, 13/04
U.S. Cl. 82—2.5 12 Claims

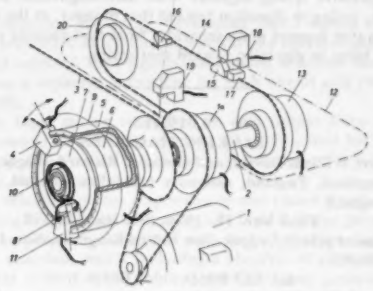


1. In a machine tool, a combination comprising a frame; a support mounted on said frame for rotation about a support axis; a plurality of carriers mounted on said support so as to share the rotation thereof about said support axis, each of said carriers having a carrier axis and a supporting surface substantially normal to said carrier axis; means for indexing said support about said support axis between a plurality of positions in each of which one of said carrier axis is substantially normal to a horizontal plane and the respective supporting surface faces downwardly and another carrier axis is substantially parallel to said plane; and conveyor means for supplying workpieces to a respective carrier the carrier axis of which extends normal to said plane, and for withdrawing finished workpieces therefrom, including a lifting table, and means for lifting said table toward said respective supporting surface so as to bring a workpiece supported on said table into contact with said respective supporting surface.

4,019,411
BAR FEED CONTROL ARRANGEMENT FOR BAR LOADING MAGAZINES

Burkhard W. Bohn; Alfred Evers, and Karl-Heinz Friederichs, all of Kiel, Germany, assignors to Hagenuk Vormals Neufeldt & Kunke GmbH, Kiel, Germany

Filed Aug. 13, 1975, Ser. No. 607,112
Claims priority, application Germany, Aug. 14, 1974, 2438934
Int. Cl.² B23B 15/00
U.S. Cl. 82—2.7 8 Claims



1. In a bar loading magazine for the automatic feeding of bars to a bar machine, the bar loading magazine being of the type comprised of bar-engaging means, a feed chain for driving the bar-engaging means, and a start switch arrangement for sensing the arrival of the leading end of a bar, the bar loading magazine including in combination therewith a feed control arrangement for establishing the feed distance required for properly positioning the leading end of the bar in the bar machine, the feed control arrangement including first and second distance-measuring means operative successively and independently of each other for controlling respective first and second components of the movement of the feed chain, the first component of the movement being a cyclical incremental movement, the second component of the movement occurring after a plurality of the cyclical incremental first components of the movement, said first distance-measuring means including fixed stop means operative for limiting the first component of the movement of the feed chain.

4,019,412
TORQUE RELEASE WRENCH

Robert A. Kraus, and Edmund J. Kraus, both of 14160 Redhill Ave. No. 39, Tustin, Calif. 92680

Filed Sept. 12, 1975, Ser. No. 612,845
Int. Cl.² B25D 23/142
U.S. Cl. 81—52.4 R 12 Claims

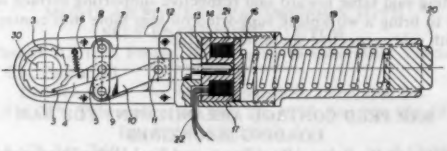
1. A wrenching structure, comprising along its general centerline, a compressive spring, a magnet plate, an annular

magnet having pole faces, as well as a center aperture and a plunger extending through that annular magnet's center aperture,

wherein that annular magnet's attractive forces together with that spring's predetermined compressive force presses that magnet plate against that annular magnet's pole faces toward that plunger,

and wherein a variable force of lesser magnitude is exerted by that plunger against that magnet plate in opposing direction toward that spring,

whereby as that variable force of lesser magnitude increases



to a point where that variable force acting toward that spring, exceeds the combined force of that spring together with that magnetical pole faces attracting forces toward that plunger, that magnet plate will separate from that magnetical pole faces in the direction toward that spring,

wherein the portion of force representing the magnetical attraction, is substracted from the combined forces of that compressive spring together with that magnetical attractive force, acting in direction toward that plunger, at the moment when that magnet plate separates from that annular magnet's pole faces in direction toward that spring.

4,019,413
PACKING MACHINES

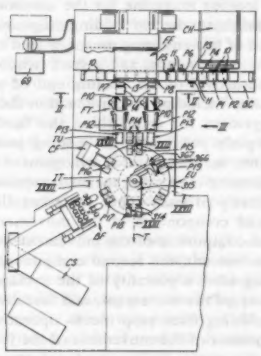
Robert William Davies, and Leonard Richard Wager, both of Deptford, England, assignors to Molins Limited, London, England

Filed Nov. 11, 1974, Ser. No. 522,798

Claims priority, application United Kingdom, Nov. 15, 1973, 53158/73

Int. Cl.² B26D 7/06; B65H 3/40

U.S. Cl. 83—88 **5 Claims**



1. Apparatus for forming overlapped wrappers for wrapping articles, such as groups of cigarettes, comprising means for cutting a web of wrapping material to form a succession of wrappers, each wrapper consisting of a large piece of web material and a small piece of web material, a larger carrier and a smaller carrier having substantially flat suction surfaces to receive said large and small pieces respectively, feed means to feed wrappers one at a time from said cutting means to said carriers, and conveyor means to convey wrappers received from said carriers towards the articles to be wrapped, said carriers being movable towards each other and being together movable between said feed means and said conveyor means, said suction surfaces of said carriers being arranged to hold said large and small pieces with their adjacent edge portions in different planes so that during movement of the carriers towards each other said pieces are brought into overlapping relationship.

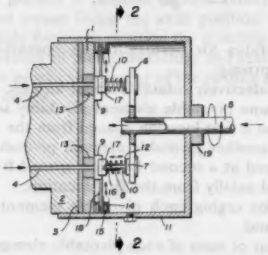
4,019,414
STRAND GRANULATION MACHINE

Dorsey O. Thomas, Jr., Chesterfield, and Alvah B. Terry, St. Louis, both of Mo., assignors to Monsanto Company, Decatur, Ala.

Filed Jan. 12, 1976, Ser. No. 648,606

Int. Cl.² D01G 1/04; B26D 5/08

U.S. Cl. 83—356.3 **1 Claim**



1. Apparatus for granulating a strand, comprising

a. an extrusion die having a plurality of extrusion channels arranged in a ring,

b. a wear plate secured to the die and having mounted therein a plurality of shear bushings having openings for passage of the strands formed by the extrusion channels,

c. a plate spaced from the wear plate and mounted for rotation about an axis concentric with the ring of extrusion channels,

d. a plurality of spring-loaded cutter yokes mounted on the plate,

e. a plurality of cutters mounted on the cutter yokes for sliding movement in directions radial to said axis,

f. a cam track mounted off center with respect to said axis,

g. a plurality of cam rollers positioned to roll along said cam track, and

h. a plurality of cam arms each connecting one of the cam rollers to one of the cutters in such a manner that each cutter reciprocates radially as the plate is rotated.

4,019,415
KEY CUTTING MACHINE

Horst W. Wich, 816 Brent St., South Pasadena, Calif. 91030

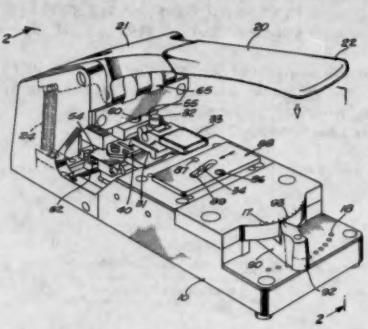
Continuation of Ser. No. 458,708, April 8, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,396

Int. Cl.² B26F 1/12

U.S. Cl. 83—413 **12 Claims**

11. In a key cutting machine, a movable carriage having punch and die means associated therewith, a springloaded punch actuating handle, a fine carriage positioning means

responsive to the operation of said handle before the punch is actuated, and a coarse carriage positioning means responsive



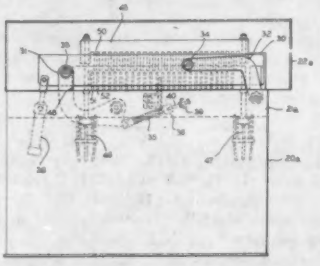
to the release of said handle for advancing the carriage to its next cutting location.

4,019,416

HYDRAULIC PAPER CUTTER

Edward W. Krauss, Skokie, Ill., assignor to IPEC, Inc., Chicago, Ill.

Filed Apr. 28, 1975, Ser. No. 572,262
Int. Cl.² B26D *5/04, 7/02*
U.S. Cl. 83—437 **11 Claims**



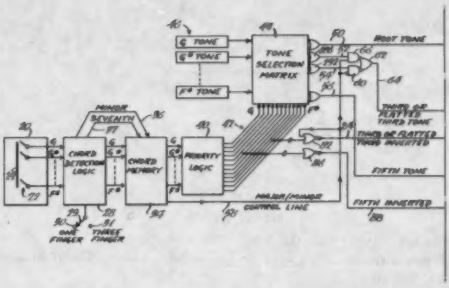
1. A low profile hydraulic paper cutter comprising a supporting table having a hold-down clamp means, a back gauge, a paper knife, and a protective housing around the knife above the top of said table and means for controlling said hold down clamp means, back gauge and knife positioned below the top of said table, means for pivotally mounting said paper knife adjacent its opposite ends on a pair of arcuate arms pivotally attached to said supporting table below the table top, means also located below the table top for selectively operating said paper knife blade to swing it on said arcuate arms with a slicing action, said operating means extending from below the supporting table to the knife blade, whereby the blade operating apparatus is positioned beneath and not above the table, means under said table top for enabling quick sets of the back gauge to position said paper under the knife blade, and means for operating said quick set means from a point above the table top.

4,019,417

ELECTRICAL MUSICAL INSTRUMENT WITH CHORD GENERATION

Alden J. Carlson, Edmonds, Wash., assignor to Warwick Electronics Inc., Chicago, Ill.

Filed June 24, 1974, Ser. No. 482,064
Int. Cl.² G10H *1/00*
U.S. Cl. 84—1.01 **8 Claims**



1. An electrical musical instrument having a plurality of tone generators for respectively generating a plurality of tone signals, in which the improvement comprises the combination of:

chord selection means for developing chord signals each representative of a chord composed of a different plurality of selected tone signals, said chord selection means having a separate output line for each one of said chord signals,

priority logic means connected to said output lines and responsive to selection of more than one chord for disabling all but one of the chord output lines from developing a chord signal; and

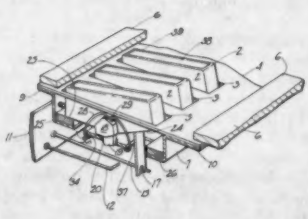
a tone selection matrix responsive to said chord signals for passing the plurality of tone signals from the tone generators respectively associated with said chord signals, the tone selection matrix including a plurality of gates, each of said gates coupled to only one of said tone generators and responsive to only one of said chord signals to pass the tone signal from the generator connected thereto and each of said chord signals causing all of those gates connected with tone generators which generate tone signals of the chord represented thereby to pass said tone signals.

4,019,418

ORGAN STOP TABLET MECHANISM

Thomas E. Kimble, Covington, Ky., and Marion B. Gregory, Cincinnati, Ohio, assignors to D. H. Baldwin Company, Cincinnati, Ohio

Filed Apr. 1, 1976, Ser. No. 672,598
Int. Cl.² G10B *3/10*; G10C *3/12*
U.S. Cl. 84—343 **18 Claims**



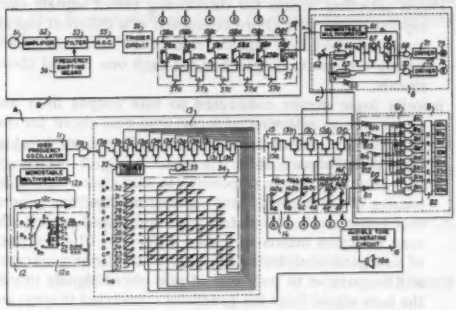
1. A stop tablet mechanism comprising a supporting frame, an elongated stop tablet seated on said frame, means mounting said stop tablet for pivotal movement to and from alternate positions of use, a pair of narrow shoulders projecting outwardly from the opposite sides of said tablet intermediate its

opposite ends, the upper edges of said shoulders defining nose-shaped cam surfaces, detent springs having their opposite ends engaging said frame on opposite sides of said shoulders with their central portions engaging said nose-shaped cam surfaces, said springs having centrally disposed inwardly directed detent points adapted to follow the nose-shaped cam surfaces as the stop tablet is moved from one position of use to the other.

4,019,419
TUNING DEVICE

Haruzo Yoshikawa; Keiji Shimano, and Noritoshi Oishi, all of Oyama, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed May 27, 1975, Ser. No. 580,789
Claims priority, application Japan, May 24, 1974, 49-58618
Int. Cl.² G10G 7/02
U.S. Cl. 84—454 **14 Claims**



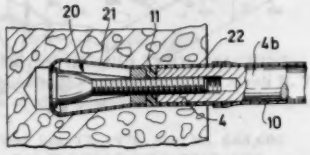
1. A tuning device for tuning musical instruments or voices comprising:

a standard pitch generating circuit including a high frequency oscillator for generating high frequency pulses at a predetermined frequency, means for generating mixing pulses having a pulse width much narrower than that of the high frequency pulses and at one of a plurality of preselected frequencies, means connected to receive both the high frequency pulses and the mixing pulses for mixing them together to accordingly shift the pitch of the high frequency pulses to thereby obtain pitch-shifted pulses, a synthesizer connected to receive the pitch-shifted pulses and operative to synthesize therefrom synthesized pulses of a desired standard pitch in a higher octave, and an octave divider circuit connected to receive the synthesized pulses to divide the same into divided pulses of the standard pitch in a lower octave; a tone-electric transducing circuit including means for detecting a tone which is to be tuned and transducing the tone into a corresponding electric signal, and a trigger circuit connected to receive the electric signal to shape the same and produce a shaped tone signal; and indicating means receptive of both the divided pulses from said octave divider circuit and the shaped tone signal from said trigger circuit for providing a visual indication of the pitch difference between the two.

4,019,420
ANCHORING DEVICE FOR USE IN MASONRY AND LIKE STRUCTURES AND HAVING PROTECTION AGAINST DELETERIOUS INFLUENCES

Artur Fischer, Altheimer Strasse 219, D-7241 Tumlingen, Germany

Continuation-in-part of Ser. No. 476,289, June 4, 1974, abandoned. This application Oct. 30, 1974, Ser. No. 519,102
Claims priority, application Germany, Nov. 2, 1973, 2354825; June 9, 1973, 2329667
Int. Cl.² F16B 13/06
U.S. Cl. 85—74 **6 Claims**

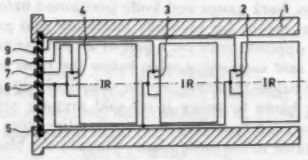


1. An anchoring device for use in masonry and like structures, comprising a first element adapted to be received and anchored in a hole of a structure, said first element including an expander member having a threaded shaft portion and operative for expanding at least a leading end of said first element; a second element having a first turnably-actuated portion located in said hole and being formed with a tapped bore which is threadedly connected with said shaft for moving said expander member in direction generally outwardly of the hole, and a second portion having a part extending outwardly from said hole and having means adapted to carry an object to be mounted on said structure; and means for preventing access of corrosion-producing media to said elements, said preventing means being of synthetic plastic material and including an axially-yieldable tubular sleeve portion sealingly surrounding said part of said second element intermediate said expander member and said object, an annular section having a pair of end faces in respective engagement with said first and second elements, said annular section frictionally engaging said shaft portion so as to prevent undesired turning of said first element during movement of said expander member, a tubular extension section sealingly surrounding another part of said second element, and a cap-shaped section sealingly surrounding said first element, all of said sections being of one-piece with each other and preventing access of corrosion-producing media to said elements.

4,019,421
ARRANGEMENT FOR SELECTIVE FIRING OF SO-CALLED IR-TORCHES

Johan Paul Ström, Jarfalla, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,282
Claims priority, application Sweden, Nov. 22, 1974, 7414669
Int. Cl.² F41F 5/02
U.S. Cl. 89—1.5 R **9 Claims**



7. A magazine adapted to be interchangeably mounted in a firing ramp of an aircraft or the like comprising, a plurality of

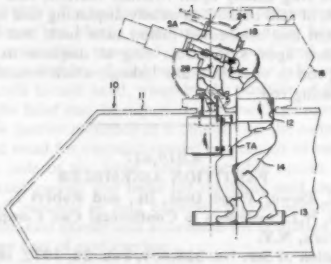
tubular frames situated within the magazine and extending parallel to the longitudinal axis of the magazine, a plurality of tubular cartridges insertable in said tubular frames with each cartridge holding a plurality of IR-torches adapted to be selectively fired in response to electric firing control signals received via a plurality of electric contact elements provided on said firing ramp, said magazine including first and second recesses adapted to mate with a respective central guiding pin and a polar guiding pin extending from the firing ramp so that the magazine will have a predetermined axial position and angular position relative to the firing ramp, each of said cartridges further comprising a plate made of an electric insulating material on which a plurality of individual electrically conductive contact rings are arranged concentrically about a central axis of the cartridge, the number of contact rings being at least one more than the number of IR-torches in said cartridge, said plate being located at the end of the cartridge which is to be directed towards the firing ramp and being arranged perpendicular to the central axis of the cartridge, said contact rings being arranged to be placed into contact with respective corresponding ones of said electric contact elements of the firing ramp when the magazine is mounted on the firing ramp.

4,019,422

VEHICULAR MOUNTED TOW MISSILE SYSTEM

Roland A. Magnuson, Renton, Wash., assignor to Paccar Inc., Bellevue, Wash.

Filed July 19, 1976, Ser. No. 706,806
Int. Cl.² F41F *3/04*; F41G *1/38*
U.S. Cl. 89—1.815 **11 Claims**



1. A vehicular turret mounting system for a TOW missile system of the type having a traversing unit, said traversing unit having a means providing an elevation pivot axis, an optical sighting and tracking unit mounted for movement about said axis, handle means for manually traversely rotating said traversing unit, means for elevationally pivoting said sighting and tracking unit, and a base having viscous bearing means supporting said traversing unit and for providing a resistance to said manual traverse rotation of the traversing unit, the improvement comprising:

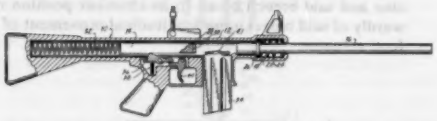
a vehicle having a hull, an opening in the hull, and a turret supported for rotational movement about a turret axis concentric with said hull opening, at least one missile launch tube elevationally pivotally mounted on said turret, a personnel station in said opening generally aligned with said turret axis, means mounting said traversing unit on said turret adjacent the periphery of said hull opening offset from said turret axis, said mounting means including means for holding the orientation of said base stationary with said hull for simulating a ground-supported TOW missile system, and servo means for traversing said turret in response to movements of said traversing unit on said base.

4,019,423

AUTOMATIC OR SEMI-AUTOMATIC FIREARM

James H. Johnson, 818 S. Willow Ave., Tampa, Fla. 33606

Division of Ser. No. 780,034, Nov. 28, 1968, abandoned. This application Oct. 19, 1970, Ser. No. 82,113
Int. Cl.² F41C *21/18*
U.S. Cl. 89—178 **7 Claims**



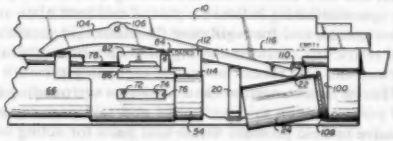
1. A firearm comprising: A frame, a bolt reciprocally mounted along the longitudinal axis of said frame, a barrel reciprocally mounted along the longitudinal axis of said frame between a first and second position, said bolt having a cartridge receiving means for receiving and inserting a cartridge in the chamber of said barrel and a cartridge extracting means for extracting said cartridge after being fired, firing means for firing said cartridge, a bolt drive spring disposed to drive said bolt forwardly, barrel biasing means to bias said barrel toward said first position, cartridge supply means for supplying a cartridge to said bolt, said bolt arranged to receive the cartridge on its forward stroke and afterwards insert the cartridge into the chamber of said barrel, said cartridge fired when in said chamber by said firing means, said bolt being biased into operative engagement with said barrel when said cartridge is fired, said bolt and said barrel in mechanically free engagement relative to each other, a gas system means for controlling the movement of said barrel relative to said frame, said gas system means including at least one propellant gas port in said barrel adjacent to the forward end of the chamber of said barrel, said gas system means further including an expandable compression chamber, said expandable cmpression chamber disposed between a portion of said barrel and a portion of said frame, said compression chamber in communication with said propellant gas port whereby when said cartridge is fired, propellant gas enters said compression chamber to act on said barrel portion to initiate rearward movement of said barrel relative to said frame, said bolt moving rearwardly under the force of said cartridge such that the initial relative motion between said bolt and said barrel is substantially zero whereby said bolt and said barrel remains in mechanically-free contact during at least a portion of the rearward movement.

4,019,424

CARTRIDGE SOFT FEED MECHANISM WITH MAGAZINE INTERRUPTER

George L. Reynolds, Cambridge, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 12, 1976, Ser. No. 675,852
Int. Cl.² F41D *11/14*
U.S. Cl. 89—137 **8 Claims**



1. A cartridge soft feed mechamism comprising:

a feed actuator mounted for longitudinal movement along an axis parallel to that of a gun barrel,

a feed lever pivotally mounted on a gun,

a cartridge magazine mounted on said gun and having an

open rear end from which cartridges exit upon being chambered, said rear end being at least a cartridge length forward of a receiver breech block to permit passage of a cartridge therebetween,

a pair of feed lifters pivotally mounted to extend one behind the other on said gun,

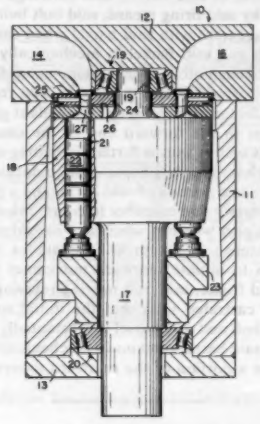
said feed lever being positioned forwardly of and pivotally connected to said feed lifters to pivot said lifters, thereby moving a cartridge that is positioned between said magazine and said breech block to its chamber position rearwardly of said barrel upon longitudinal movement of said feed actuator.

4,019,425

PISTON PUMP WITH FLOATING PORT PLATE PROVIDING VARIABLE FORCE BALANCE FOR HYDROSTATIC BALANCE

Ralph Anthony Matzelle, Brimfield, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 7, 1975, Ser. No. 547,905
Int. Cl.² F01B *13/04*
U.S. Cl. 91—487 **5 Claims**



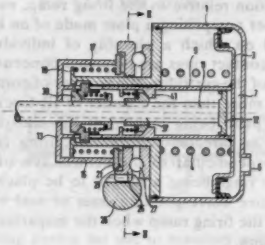
1. A port plate for a hydraulic fluid pressure energy translating device floatingly disposed between a barrel and a port cap of said device and having a plurality of ports for communicating therebetween, said port plate having hydrostatic presure balancing means for balancing hydrostatic pressures of both sides thereof within the device to obtain an optimum bearing clearance between said port plate and said barrel, said balancing means includes a plurality of fluid-containing recess means within a bearing surface of said port plate directed toward said barrel and flow control means including a fluid-flow passageway communicating between a port of said port plate and said recess means, and for regulating flow into said recess means, fluid restricting means including an orifice between said passageway and said recess means for regulating pressure within said recess means, narrow band sill means surrounding each of said ports between said port plate and said port cap and responsive to fluid pressure within said ports for acting in opposition to pressure in said recess means for balancing hydrostatic pressure acting on said port plate, said narrow band sill means being defined by a seal disposed between said port plate and said cap and having one surface in contact with said port plate and an opposing second surface defining said sill means in open communication with fluid in said port.

4,019,426

HAND BRAKE FOR A BRAKE CYLINDER

Bernd Wosegien, and Georg Stäuble, both of Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Nov. 6, 1975, Ser. No. 629,662
Claims priority, application Germany, Nov. 12, 1974, 2453497
Int. Cl.² F01B *31/00*; F16J *1/10*
U.S. Cl. 92—113 **8 Claims**



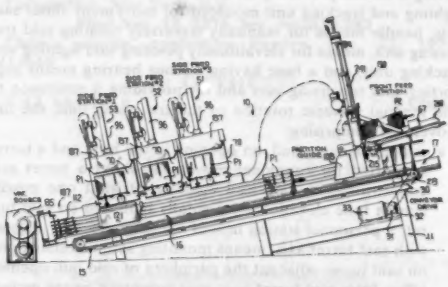
1. In a brake cylinder, the combination of a cylinder having a piston reciprocable therein, a piston tube extending from said piston outwardly of said cylinder, an actuating rod slidably positioned within said piston tube and extending outwardly thereof for connection to a brake linkage, means including a thrust ring acting upon a portion of said piston tube for adjusting said actuating rod with respect to said piston tube, an intermediate element connected to said piston tube, a brake ring rotatably mounted around said piston tube and axially displaceable toward said intermediate element, means engaging said brake ring for manually rotating said brake ring, wedge gear means acting upon said brake ring for displacing said brake ring axially upon rotation thereof, said axial displacement of said brake ring axially displacing said intermediate element and connected piston tube such that said tube portion acts upon said thrust ring to displace axially said actuating rod to operate brake linkage which is connected to said actuating rod.

4,019,427

PARTITION ASSEMBLER

Alfred G. Down, Wood Dale, Ill., and Robert L. Nebeling, Wayne, N.J., assignors to Continental Can Company, Inc., New York, N.Y.

Continuation of Ser. No. 228,559, Feb. 28, 1972, abandoned. This application Dec. 1, 1975, Ser. No. 636,568
Int. Cl.² B31D *3/04*
U.S. Cl. 93—37 R **28 Claims**



25. A method of assembling elements in generally crossed relationship comprising the steps of feeding at least two elements in succession along a first path, said elements being fed with a trailing edge of a leading element being followed by a leading edge of a trailing element and said trailing and leading

elements being in a uniplanar plane, shifting the leading of the two elements transversely out of the first path, conveying the two elements in unison along a second path in transverse relationship to said first path, feeding a further element along a third path in transverse relationship to said second path, and cross assembling said two and further elements at an intersection of said second and third paths.

4,019,428

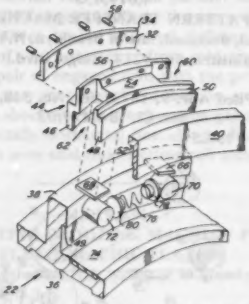
QUICK-SET SLOTTER KNIFE

William Grobman, Philadelphia, Pa., assignor to Molins Machine Company, Inc., Camden, N.J.

Division of Ser. No. 504,934, Sept. 11, 1974, Pat. No. 3,954,050. This application Nov. 28, 1975, Ser. No. 636,286

Int. Cl.² B31B *1/22*

U.S. Cl. 93—58.2 R **5 Claims**



1. An article of manufacture for use in apparatus for processing planar box blanks comprising an annular head, a slotter knife releasably mounted on said head and projecting beyond the periphery of said head, means for releasably locking said knife to said head, whereby the position of the slotter knife on the head may be adjusted, said locking means including a knife carrier mounted in a channel on the outer periphery of said head for circumferential movement of said carrier about the axis of the head, and expansible means effective between said carrier and head for retaining said carrier in a preselected position in said channel, said expansible means being within said carrier and accessible for actuation adjacent at least one end of said carrier.

4,019,429

VENTILATOR

Yukio Sado, Asahi, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,174

Claims priority, application Japan, Nov. 28, 1974, 49-145410

Int. Cl.² F24F *13/18*

U.S. Cl. 98—37 **8 Claims**

1. A ventilator for use in a building component comprising:

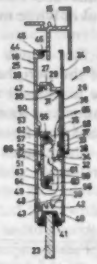
a. an inner plate having air vent means formed therein:

b. an outer plate near upper and lower margins secured to said inner plate and spaced therefrom in the transverse direction of the ventilator, and having an air-intake opening vertically displaced from said air vent means;

c. a filter-retaining means having grooves at its upper and lower edges, said filter-retaining means being disposed between and secured to one of said inner and outer plates;

d. a filter extending between said grooves across a hollow space therebetween and secured in said grooves; and

e. a partition extending from the other of said inner and outer plates toward said one plate and abutting against



said filter for directing a flow of air at least twice through said filter.

4,019,430

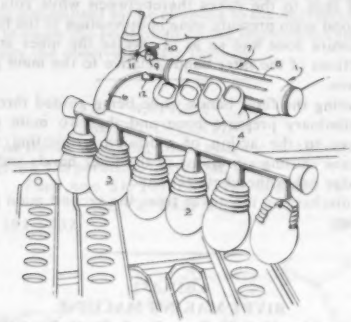
VACUUM EGG LIFTING AND PENETRATING MEANS

William H. Warren, 729 S. Main St., Centerville, Mass. 02632

Filed July 9, 1975, Ser. No. 594,334

Int. Cl.² A23P *1/00*

U.S. Cl. 99—485 **8 Claims**



1. An improved vacuum egg handling means comprising the combination of:

a vacuum support means for receiving and supporting eggs;

means for connecting said support means to a source of vacuum;

punch means positioned on said support means for punching an aperture in the shells of eggs held by said support means; and

said connecting means including means for controlling the vacuum such that said eggs as a result of said vacuum are forced into engagement with said punch means.

4,019,431

METHOD OF DEWATERING SLUDGE

Wendel Bastgen, Betzdorf, Sieg, Germany, assignor to Alb. Klein KG, Niederfischbach, Germany

Filed June 7, 1974, Ser. No. 477,413

Claims priority, application Germany, June 13, 1973, 2330029; Mar. 17, 1973, 233368

Int. Cl.² B30B *9/24*

U.S. Cl. 100—37 **8 Claims**

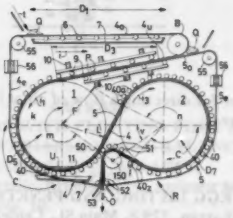
1. A method of dewatering sludge, said method comprising the steps of:

feeding successive quantities of sludge in cake form through a preliminary dewatering zone in the form of a moving filter band;

then feeding the partially dewatered cakes through a preliminary pressure zone in the form of two spaced apart relatively moving filter bands by guiding the cakes between said two bands and causing the bands to exert pressure upon the cakes while moving along and between bands;

then guiding the two filer bands with the cakes therebetween about part of the periphery of a rotary first main dewatering pressure zone and applying pressure to the outer one of said bands and thus to the cakes while being guided by and on said first main pressure zone;

then guiding the two filter bands with the cakes therebetween from said first main pressure zone to and partly



over the periphery of a rotary second main dewatering pressure zone and applying pressure to the filter bands and thus to the cakes therebetween while rotating the second main pressure zone in opposition to the first main pressure zone and so as to reverse the inner and outer portions of the filter bands relative to the main pressure zones;

subjecting the filter bands while being guided through the preliminary pressure zone and the two main pressure zones to the action of vibration generating pressure means causing vibrations of the filter bands and thus of sludge cakes therebetween; and

then discharging the cakes from the second main pressure zone.

4,019,432

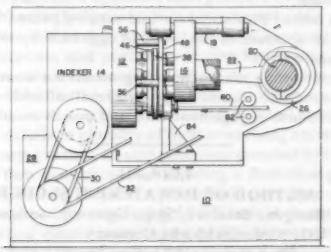
RIVET MAKING MACHINE

Albert Dunkin, 12 Split Rock Road, South Norwalk, Conn. 06854

Filed Jan. 21, 1976, Ser. No. 651,149

Int. Cl.² B21K *1/58*

U.S. Cl. 10—13 **22 Claims**



1. A rivet making machine comprising:

means supporting a stationary set of working tools at laterally spaced stations;

ram means for supporting a reciprocable set of working tools at said laterally spaced stations to be in axial alignment with said stationary set of working tools and cooperable therewith to apply working force to opposite ends of a blank positioned at one or more of said stations upon axial advancing movement of said reciprocal set toward said stationary set;

an indexing plate interposed between said sets of working tools and in an axial position fixed with respect to said stationary set;

a set of body dies carried by said indexing plate for incremental lateral movement between said stations, each body die of said set of body dies having an axial, open-ended die cavity and being independently movable in an axial direction relative to said plate, whereby each such body die and a blank located in the die cavity thereof may be advanced axially by any one of said reciprocal set of working tools into working engagement with a corresponding one of said stationary set of working tools at any one of said stations; and

means supported independently of said indexing plate to axially position said body dies relative to said indexing plate during lateral indexing movement thereof.

4,019,433

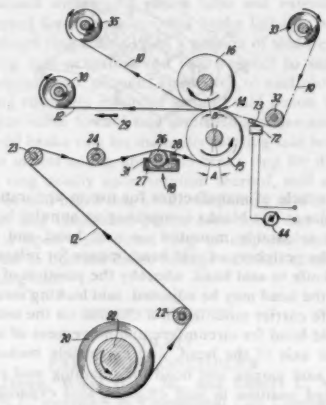
PATTERN TRANSFER MACHINE

Frank J. Cutri, deceased, late of Brooklyn, N.Y., and by Louise Cutri, administratrix, 9214 Ridge Blvd., Brooklyn, N.Y. 11209

Filed Apr. 9, 1973, Ser. No. 348,959

Int. Cl.² B41L *7/08*

U.S. Cl. 101—132.5 **11 Claims**



1. A duplicating machine for transferring a pattern from a moving master sheet to a moving copy sheet, comprising:

a pair of parallel upper and lower engaged rolls forming therebetween a nip for receiving said master copy sheets in face-to-face contact,

motor means rotatably driving at least one of said pair of engaged rolls, and

means mounting at least one of said pair of engaged rolls in yieldable pressure contact with the other roll of said pair of rolls,

whereby said engaged rolls rotate in counter-rotating directions to thereby feed said master and copy sheets therebetween in face-to-face pressure contact;

a master sheet supply roll and a master sheet rewind roll mounted parallel to and on opposite sides of said pair of engaged rolls at a point above said nip, whereby said master sheet passes from its supply roll through said nip to its rewind roll in a generally V-shaped path;

fluid wetting roll means mounted parallel and in closely spaced relation to the lower roll of said pair of engaged rolls at a point adjacent the lower portion thereof and on the same side thereof as said master sheet rewind roll;

a copy sheet supply roll mounted parallel to said pair of engaged rolls at a point below said nip and also below said fluid wetting roll means;

copy sheet idler roll means located in spaced relationship between said copy sheet supply roll and said fluid wetting roll means and positioned so as to guide said copy sheet in a generally horizontal line over said fluid wetting roll means in pressure contact therewith and thence into contact with the circumferential surface of said lower roll of said pair of engaged rolls,

said fluid wetting roll mens engaging a first surface of said copy sheet to locate said copy sheet for subsequent engagement with said lower roll of said pair of engaged rolls and for applying fluid reactive with a pattern carried by said master sheet for moistening said first surface thereof, said copy sheet thereafter engaging said lower roll of said pair of engaged rolls on a second surface thereof which is opposite said first surface,

said copy sheet engaging said lower roll of said pair of engaged rolls at a point at least 180° upstream of said nip formed between said lower roll and said upper roll engaged therewith; and

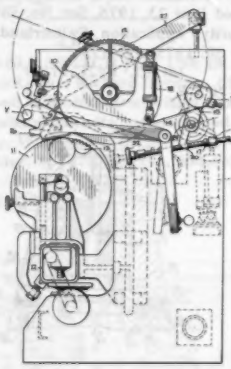
a copy sheet rewind roll mounted parallel to and spaced from said pair of engaged rolls on the same side thereof as the master sheet rewind roll and defining therewith a return run of said copy sheet from said nip formed between said pair of engaged rolls with the printed pattern from said master sheet imprinted thereon, said return run of said copy sheet moving in a direction generally parallel to said generally horizontal line along which said copy sheet travels over said fluid wetting roll means.

4,019,434

MOUNTING-PROOFING MACHINE FOR FLEXOGRAPHIC PLATES

Rolf Hoexter, Engelwood, N.J., assignor to Mosstype Corporation, Waldwick, N.J.

Filed Apr. 1, 1976, Ser. No. 672,771
Int. Cl.² B41F *5/00*
U.S. Cl. 101—216 **8 Claims**



1. A flexographic mounting-proofing machine comprising:

A. an impression cylinder rotatable on a first shaft about a fixed horizontal axis;

B. an impression cylinder gear having the same diameter as the impression cylinder and rotatable on a second shaft and a swingable arm for supporting said second shaft about a horizontal axis which as the arm swings is displaced with respect to the fixed axis of the impression cylinder from an initial position in which the two axes are coaxial with each other to a displaced parallel position;

C. a parallel displacement coupling interlinking thre first and second shafts whereby rotation of the impression cylinder results in a corresponding rotation of the impression cylinder gear regardless of the position of the second shaft relative to the first shaft;

D. a plate cylinder rotatable on a third shaft about a horizontal axis parallel to the fixed axis;

E. a plate cylinder gear mounted for rotation on said third shaft and having the same diameter as said plate cylinder whereby rotation of the plate cylinder gear results in a corresponding rotation of the plate cylinder, said plate cylinder gear intermeshing with said impression cylinder gear whereby rotation of said impression cylinder is transmitted by said coupling to said plate cylinder and results in rotation of the plate cylinder in the reverse direction to an extent determined by the ratio of said gears;

F. elevator means to raise said plate cylinder and the plate cylinder gear associated therewith from a mounting state in which said plate cylinder is separated from said impression cylinder to a proofing state in which said plate cylinder makes contact with said impression cylinder and a print point on said plate cylinder is physically coincident with a print point on said impression cylinder;

G. a retractable viewer, and means to shift the viewer to a retracted position in the proofing state and to an operative position in the mounting state in which the viewer occupies a position in which an observation site on said plate cylinder is optically coincident with an equidistant observation site on said impression cylinder, and

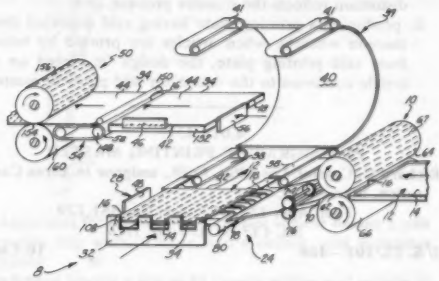
H. means to shift said arm to an extent causing said impression cylinder gear to ride on said plate cylinder gear and to rotate, the rotation of the impression cylinder gear and to rotate, the rotation of the impression cylinder gear being transmitted by the coupling to the impression cylinder to cause the print point on the impression cylinder to occupy the observation site thereon.

4,019,435

SHEET INVERTING

William A. Davis, Wickliffe, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 21, 1975, Ser. No. 606,660
Int. Cl.² B41F *21/00*
U.S. Cl. 101—232 **23 Claims**



1. An apparatus for sequentially working on flexible sheets which comprises:

first work means for working on a sheet as it moves therethrough in a first path with one side facing upwardly and a first edge leading;

second work means spaced from said first work means for subsequently working on the sheet with the other side of the sheet facing upwardly as it moves therethrough in a second path which is a substantial extension of said first path; and

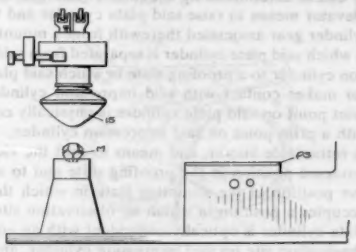
sheet inverting means between said first and second work means for receiving said sheet from said first work means along said first path, for moving said sheet along a U-shaped turnover path substantially normal to said first and second paths with a second edge normal to said first edge leading, and for thereafter feeding the sheet along

said second path to said second work means with said second side facing upwardly and said first edge leading.

4,019,436
TECHNIQUE FOR PRODUCING A PRE-DISTORTED DESIGN FORMAT FOR USE IN TRANSFER PRINTING

Martin Handweiler, 568 Grand St., New York, N.Y. 10002, and George Castanis, 444 6th Ave., New York, N.Y. 10011

Filed June 16, 1976, Ser. No. 696,765
Int. Cl.² B41F 17/00
U.S. Cl. 101—463 7 Claims



1. The technique for producing a pre-distorted design format on a printing plate for use in a print transfer system in which the inked design on the plate is picked up by a conformable transfer pad and impressed on the irregular surface of an article to be imprinted, the pad being forced against the surface and being distorted to conform thereto, said technique comprising the steps of:

A. forming a physical master which is an exact replica of the article to be imprinted;

B. treating the surface of the master to create a distortion-free design thereon which is capable of accepting ink;

C. inking the design on the master;

D. picking up the inked design on the master by the transfer pad and pressing the inked transfer pad onto a proof sheet to produce thereon a distorted design whose degree of distortion reflects the transfer process; and

E. producing a printing plate having said distorted design thereon whereby when articles are printed by transfer from said printing plate, the design imprinted on said article conforms to the design on said physical master.

4,019,437
PLANOGRAPHIC PRINTING MASTER

Richard G. Crystal, Los Altos, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 13, 1973, Ser. No. 351,129
Int. Cl.² B41C 3/06, 1/10
U.S. Cl. 101—466 10 Claims

1. A method of producing a printing master comprising:

a. providing a suitable substrate,

b. coating said substrate with a layer of an uncured silicone gum,

c. depositing a particulate image pattern on said layer, whereby said particles adhere to said layer in imagewise configuration,

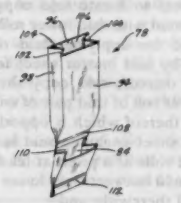
d. curing said layer to an ink releasable condition thereby fixing said particles in said layer without substantial coalescence of said particles, and

e. removing said fixed particles to reveal an ink receptive image corresponding to said deposited image pattern.

4,019,438
SLEEVING AND SLEEVING STAND APPARATUS AND METHOD

Floyd R. Swanson, Jr., Cedar Falls, Iowa, assignor to Swanson Engineering, Inc., Cedar Falls, Iowa

Filed June 16, 1975, Ser. No. 586,957
Int. Cl.² F42B 3/00
U.S. Cl. 102—24 R 2 Claims



1. A blast hole liner sleeve having a top opening, and a bottom, comprising:

a heat sealable front wall panel,

a heat sealable rear wall panel,

said front and rear wall panels being joined by a pair of oppositely disposed gusset walls,

a first heat seal transverse to the longitudinal axis of said sleeve and spaced upwardly from the bottom of said sleeve,

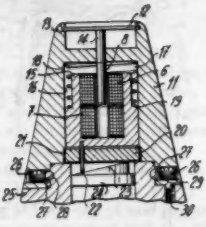
an opening below said first heat seal defined by said front wall panel and said gusset walls, and

a bottom heat seal spaced apart from and below said first heat seal and said opening.

4,019,439
ELECTRIC FIRING DEVICE FOR A PYROTECHNIC CHARGE

Roger Beuchat, Geneva, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

Filed June 23, 1975, Ser. No. 589,544
Claims priority, application Switzerland, July 5, 1974, 9247/74; May 30, 1975, 6967/75
Int. Cl.² F42C 11/00
U.S. Cl. 102—70.2 R 7 Claims

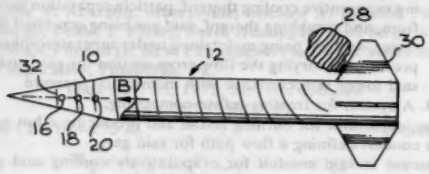


1. In a projectile, an electric firing device for a pyrotechnic charge, comprising a pulse generator, a firing control element activable by at least one pulse, and control means for the application of pulses from said pulse generator to said element, said control means comprising an electromagnetic transducer mounted within said projectile and including a primary winding having first and second ends, said first end receiving pulses from said pulse generator, said second end connected to ground, a secondary winding having first and second terminals, said first terminal connected to ground, said second terminal connected to said element, a ferromagnetic core providing a coupling between the two windings, and means for mounting the core and at least one of the windings for movement relative to one another to vary and control said coupling.

4,019,440
IMPACT DISCRIMINATING APPARATUS FOR MISSILES AND THE LIKE, AND METHOD FOR IMPACT DISCRIMINATION

Robert Strike, Pomona, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed July 10, 1975, Ser. No. 594,903
Int. Cl.² F42C 11/00
U.S. Cl. 102—70.2 R **13 Claims**



10. A method for impact shock discrimination, which comprises the steps of:

a. arranging, within a movable object, a plurality of impact shock sensors in spaced relationship generally along a preselected line of impact, said sensors having output signals responsive to shock waves sensed thereby,

b. converting said output signals from each of said sensors into pulses,

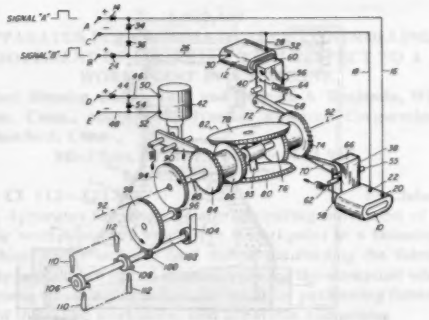
c. causing widths of said pulses to vary in direct relationship with spacing of associated sensors from a preselected point of impact, whereby a shock wave propagated along said line of impact rearwardly through said object from said impact point causes an overlapping of said pulses and whereby a shock wave propagated forwardly through said object along said line of impact toward said impact point does not cause overlapping of said pulses, and

d. feeding said pulses into a discriminating element which discriminates between overlapping pulses and non-overlapping pulses, whereby directional discrimination of shock wave propagation is provided.

4,019,441
WARHEAD ENABLE SWITCH FOR USE IN A MISSILE

Melvin Morgen, Rockaway; Richard Herman, Clifton, both of N.J., and Raymond A. Wolski, New Britain, Conn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 8, 1976, Ser. No. 664,448
Int. Cl.² F42C 15/40
U.S. Cl. 102—70.2 R **4 Claims**



1. A warhead enable switch for safing and arming a missile warhead circuit under missile stress environments which comprises:

differential means for generating a single rotary output in response to a plurality of mechanical inputs;

dual solenoid drive means for providing a first mechanical input to said differential means;

solenoid locking means for providing a second mechanical input to said differential means;

series diode means electrically coupled to said solenoid drive means and said solenoid locking means permitting electrical signals of only a specific polarity to initiate said solenoid drive means;

shunt diode means electrically coupled in parallel with the coils of said solenoid means said solenoid locking means for reducing the peak inverse voltage on the coils of said solenoid drive means and said solenoid locking means when the magnetic fields on said coils collapse;

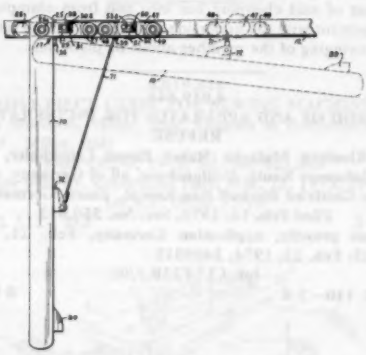
spring biased rotary switch means for placing said missile in an "armed" position when each of said dual solenoid drive means and said solenoid lock means have received a proper input signal thereto, and for returning said missile to a zero "safe" position when either of said dual solenoid drive means and said solenoid lock means receive an improper input signal; and

gearing means for mechanically coupling said rotary switch means to the rotary output of said differential means.

4,019,442
BULKHEAD ASSEMBLY AND COUNTERBALANCE MECHANISM THEREFOR

Earnest M. Lee, Shawnee Mission, Kans., and Grady L. Clyma, Kansas City, Mo., assignors to Roll-O-Matic Chain Company, Kansas City, Mo.

Filed Mar. 6, 1975, Ser. No. 555,985
Int. Cl.² B60P 7/14
U.S. Cl. 105—376 **8 Claims**



1. Apparatus for partitioning a carrier vehicle having a pair of opposite side walls, a floor, and a ceiling, said apparatus comprising:

a bulkhead having a size to fit closely within said vehicle in a substantially upright position to effect a seal therein;

means for mounting said bulkhead in extension substantially between said side walls for pivotal movement about a substantially horizontal pivot axis located in proximity to said ceiling, and for longitudinal movement within the vehicle in a manner to permit said bulkhead to be oriented in said upright position at a variety of locations along the length of the vehicle;

a winding member;

means supporting said winding member for rotation within said vehicle and for longitudinal movement therewithin along with said bulkhead;

a flexible cable wound on said winding member and having an end coupled to said bulkhead at a location offset from the pivot axis thereof; and

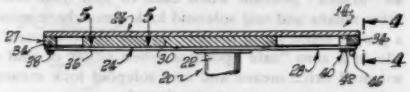
yieldable means exerting a rotative force on said winding member, said yieldable means being operable when said

seal is broken to rotate said winding member in a direction to wind up said cable and thereby pivot said bulkhead about its pivot axis from said upriht position to a raised position adjacent said ceiling.

4,019,443
TABLE

Ferris E. Jones, 943 Millbury Ave., La Puente, Calif. 91746

Continuation-in-part of Ser. No. 365,438, May 31, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,136
Int. Cl.² A47B *13/00*
U.S. Cl. 108—137 **9 Claims**

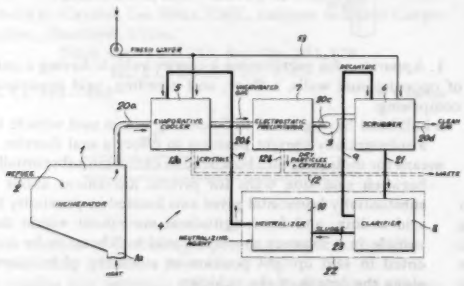


1. A table comprising:
a supporting base including a horizontal platform,
a table top overlying and slidably supported on said platform for edgewise adjustment relative to the platform,
said top having larger edgewise dimensions than said platform and projecting edgewise beyond said platform, and
means for firmly clamping said top against edgewise movement relative to said platform including a clamping bar extending across the underside of said platform and beyond two opposite edges of the platform, whereby said bar has opposite ends located beyond said opposite platform edges and below said top, means pivotally mounting said clamping bar on said top to swing in a plane parallel to said top and platform, and means for effecting movement of said clamping bar into and from clamping engagement with the underside of said platform in response to swinging of the member about its pivot axis.

4,019,444
METHOD OF AND APPARATUS FOR INCINERATING REFUSE

Ulrich Kleeberg, Mulheim (Ruhr); Jürgen Leimkühler, Essen, and Johannes Kautz, Heiligenhaus, all of Germany, assignors to Gottfried Bischoff Bau Kompl., Essen, Germany

Filed Feb. 14, 1975, Ser. No. 550,013
Claims priority, application Germany, Feb. 21, 1974, 2408223; Feb. 23, 1974, 2408815
Int. Cl.² F23B *1/00*
U.S. Cl. 110—7 R **8 Claims**



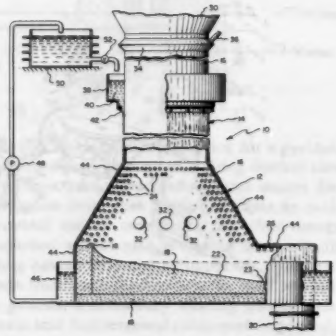
1. A method of treating refuse comprising the steps of:
incinerating refuse to produce a hot impurity-bearing gas;
evaporatively cooling said gas with a cooling liquid which is flash evaporated;
thereafter separating particles from said gas in a dry process;
thereafter contacting said gas with a scrubbing liquid to scrub said gas and produce a scrubbing liquor;
clarifying said liquor to produce a decantate and a sludge;
recirculating said decantate for use as said scrubbing liquid;
neutralizing said sludge;
recirculating the neutralized sludge and using same as at least part of said cooling liquid, whereby impurities in said gas are dissolved in said scrubbing liquid and separated out as crystals during the dry-particle separation step;
maintaining said gas above its dewpoint during evaporative cooling of said gas and particle separation therefrom;
maintaining said gas under superatmospheric pressure during evaporative cooling thereof, particle separation therefrom, and scrubbing thereof, said gas being scrubbed in a tower, said gas being maintained under superatmospheric pressure by varying the flow cross-section for gas leaving said tower in accordance with incinerator pressure.

3. A system for treating refuse comprising:
an incinerator for burning refuse and producing a hot gas;
a conduit defining a flow path for said gas;
means in said conduit for evaporatively cooling said gas with a cooling liquid;
dry separator means downstream of the evaporative-cooler means in said conduit for separating particles from said gas in a dry process;
scrubbing means downstream of said dry separator means in said conduit for contacting said gas with a scrubbing liquid for scrubbing said gas and producing a scrubbing liquor;
clarifying means connected to said scrubbing means for reducing said liquor to a decantate and a sludge
circulating means for recirculating said decantate between said clarifying means and said scrubbing means and thereby feeding said decantate into said scrubbing means as said scrubbing liquid;
means connected to said clarifying means for neutralizing said sludge and forming salts therein; and
means connected to the neutralizing means for feeding the neutralized sludge back to said evaporative-cooler means as at least part of said cooling liquid, said evaporative-cooler means producing crystals in said gas from the salts formed in said neutralizing means, said crystals being recovered from said gas by said dry separator means.

4,019,445
STUDDED HEARTH

John Z. Stoia, Lewiston, and Clarence E. Wright, Tonawanda, both of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Filed Oct. 8, 1975, Ser. No. 620,893
Int. Cl.² F23G *5/00;* **F23J** *1/00*
U.S. Cl. 110—10 **6 Claims**



1. A slagging pyrolysis furnace including a hearth defined by a metal wall having one side thereof facing said hearth, a plurality of protrusions affixed directly to said one side of said wall and freely extending in spaced relation into said hearth

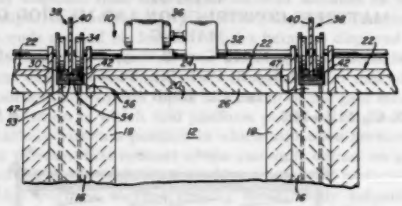
without any refractory material being interposed therebetween, and cooling means comprised of means for passing fluid along said wall on the side thereof facing away from said hearth for cooling said wall and said protrusions and for solidifying a layer of slag to coat and protect said protrusions and said one side of said wall.

4,019,446

RAIL GIRDER FOR SOAKING-PIT COVER

Eugene V. Abarotin, Murrysville; Michael A. Buckiso, Pittsburgh; Daniel T. Farley, North Huntingdon, and Stephen R. Simko, Pittsburgh, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Nov. 26, 1975, Ser. No. 635,500
Int. Cl.² F23M *7/00*
U.S. Cl. 110—173 A **8 Claims**



1. In an industrial furnace arrangement including upstanding end and median walls defining a plurality of mutually adjacent chambers; the tops of said walls cooperating to define substantially rectangular openings to said chambers; wheeled carriage-mounted covers for closing said openings; a plurality of rails parallel to the tops of said median walls engaging the wheels of said carriages for guiding the movement thereof toward and away from said openings; the improvement comprising support structure for said rails, said support structure including:

a. an elongated beam of inverted T-shaped cross sectional configuration having an upstanding web portion sized to present sufficient surface area to effectively dissipate heat therefrom to prevent inordinate thermal stressing of said beam;

b. a base flange coextensive with said web and connected thereto along the bottom edge thereof;

c. means for mounting said rails on the upper surfaces of said base flange on opposite sides of said web; and

d. means for mounting said beam above the top of a median wall.

4,019,447

APPARATUS FOR AUTOMATICALLY CONTROLLING MOVEMENT OF MATERIAL WITH RESPECT TO A WORK POINT IN A MACHINE

Hubert Blessing, Dallas, Tex., and Kenneth A. Benjamin, Wilton, Conn., assignors to Ivanhoe Research Corporation, Stamford, Conn.

Filed Sept. 19, 1975, Ser. No. 614,936
Int. Cl.² D05B *19/00*
U.S. Cl. 112—121.11 **13 Claims**

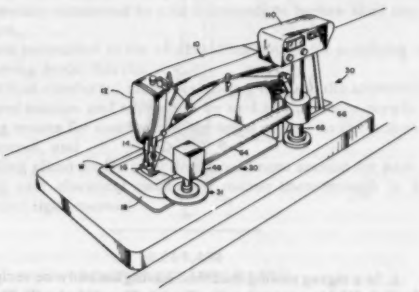
1. Apparatus for automatically controlling movement of a fabric workpiece with respect to a workpoint in a fastening machine which includes feed means for feeding the fabric workpiece along a line of approach toward the workpoint with fastening means acting at the workpoint for performing fastening of the fabric workpiece, said apparatus comprising

revolvable contacting means for contacting the fabric workpiece,

mounting means rotatably mounting said contacting means in a position for engaging only a localized region of the fabric workpiece,

said localized region of the fabric workpiece being directly in front of the workpoint and being on said line of approach,

said mounting means holding said revolvable contacting means continuously in contact with the fabric workpiece directly in front of the workpoint as the fabric workpiece is moving toward the workpoint along said line of approach,



reversible drive means for revolving said contacting means in either direction for moving said localized region of the workpiece either to the left or right laterally with respect to said line of approach, and

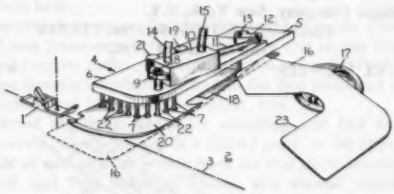
control means connected to said reversible drive means for controlling its operation.

4,019,448

WORKPIECE GUIDE FOR SEWING MACHINES

Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

Filed Oct. 9, 1975, Ser. No. 621,224
Claims priority, application Italy, Mar. 12, 1975, 21156/75
Int. Cl.² D05B *35/10*
U.S. Cl. 112—153 **3 Claims**



1. In a workpiece guide for sewing machines having a vertical wall disposed perpendicular to the work surface of the machine on the right hand side of the sewing axis with an upper plate spaced from the work surface and extending parallel with the latter beyond the sewing axis, the improvement comprising:

a. at least one movable plate (**16**) pivotably mounted intermediate the upper plate and the work surface;

b. means for pivoting said movable plate between an operative position overlying the sewing axis and an inoperative position spaced from the sewing axis; and

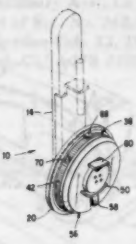
c. means on the work surface for operative association with said movable plate for elevating the latter in its inoperative position to a location above its operative position for effecting a descending movement thereof during its return to the latter position by said pivoting means.

4,019,449

AUTOMATIC BUTTONHOLING SIZING DEVICE

Robert Conrad Hauf, Upper Montclair, N.J., assignor to The Singer Company, New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,510
Int. Cl.² D05B *3/02*
U.S. Cl. 112—158 B **3 Claims**



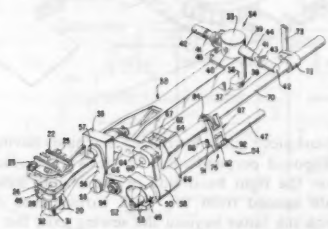
1. In a zigzag sewing machine having an endwise reciprocating needle bar, a mechanism for jogging said needle bar laterally to produce zigzag stitches including a member regulating the neutral position of the needle-jogging motion, a work-feeding mechanism including a feed-regulating member having a range of positions corresponding to forward and reverse directions of work feed, an actuating mechanism in said sewing machine operatively connected to impart endwise reciprocatory and lateral vibratory movements to said needle bar and movements to said work-feeding mechanism in timed relation thereto, a buttonholing assembly for controlling the functions of said sewing machine in the formation of a buttonhole, and a sensing wheel assembly for metering the size of the buttonhole being sewn having adjusting means for programming various size buttonholes, in combination with an automatic buttonhole sizing device comprising means for supporting a button for gauging the size of a buttonhole, means or measuring the size of said button, and means for connecting said measuring means to said adjusting means.

4,019,450

FEED REGULATOR LOCKS

Kenneth Douglas Adams, Madison, N.J., assignor to The Singer Company, New York, N.Y.

Filed Aug. 12, 1976, Ser. No. 713,953
Int. Cl.² D05B *27/02*
U.S. Cl. 112—215 **4 Claims**



1. A work feed system for a sewing machine having a frame including a work supporting bed housing said feed system, a throat plate carried by said work supporting bed and having a feed dog accommodating slot therein, said feed system including a feed dog having a work supporting rib arranged in said feed dog accommodating slot of said throat plate, a feed shaft, a feed lift cam supported on said feed shaft for alternately raising and lowering said feed dog to and from a work advancing position with said work supporting rib extending through said feed dog accommodating slot, a feed regulator shaft, a regulator affixed to said feed regulator shaft for selectively varying the direction and rate of work advance movement, means for rotating said feed regulator shaft for selective variation of the direction and rate of said work advance movement, wherein the improvement comprises:

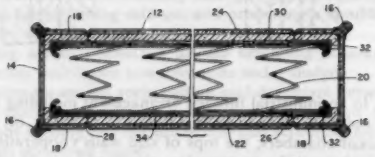
a radially functioning camming device on said feed shaft operating in synchronism with said feed lift cam; a brake member affixed to said feed regulator shaft; and shiftable means extending in a plane transverse to said feed shaft between said camming device and said brake member and responsive to said camming device during said raising of said feed dog to said work advancing position for inhibiting movement of said brake member and said feed regulator.

4,019,451

MATTRESS CONSTRUCTION AND METHOD OF MAKING

William L. Autrey, 13612 Carroll Way, Tustin, Calif. 92680

Filed Dec. 8, 1975, Ser. No. 638,564
Int. Cl.² D05B *1/00*
U.S. Cl. 112—262 **4 Claims**



1. A method of constructing a mattress comprising:

tacking first and second pre-cut covers to first and second pre-cut foam pads of the same size;

stitching flanging material around the edge of the cover assemblies a predetermined distance from the edge to provide a wide flange of cover material;

fastening the first and second covers to first and second sides of a coil spring by securing the flange material around the rim of the spring;

stitching a side cover to said first cover with a border tape;

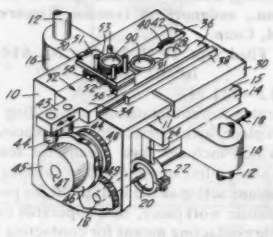
stitching said side cover to said second cover while pulling said wide flange to stretch said cover and foam pad laterally to produce a relatively flat surface with squared sides.

4,019,452

CAN END FEED MECHANISM

John W. Rouse, Fairlawn, N.J., assignor to American Can Company, Greenwich, Conn.

Filed May 6, 1976, Ser. No. 683,935
Int. Cl.² B21D *43/00, 43/16*
U.S. Cl. 113—114 BE **18 Claims**



1. In a mechanism for feeding individual can ends from a stack thereof, which ends have curled peripheral edge portions, the combination comprising: stacking means for disposing a multiplicity of can ends in a generally vertical stack; gate

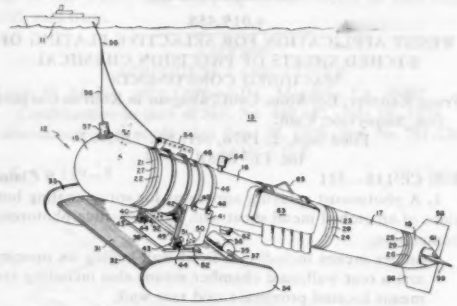
means having a platform portion for providing underlying support for the ends disposed in said stacking means, and having an open portion through which the ends may pass; and means for mounting said gate means for movement so as to sequentially align on said axis of said stacking means said platform portion and said open portion thereof, said gate means including a pair of elongated blades mounted in confronting relationship to one another along the opposite sides of said open portion thereof, the spacing between said blades gradually decreasing from their forward ends, to cause rearward portions thereof to project beyond the adjacent margins of said open portion and to thereby cooperatively define a tapered channel thereto, the inner edges of said forward portions of said blades being of generally wedge-shaped cross section to provide upper and lower inclined surfaces thereon, said blades also having upper support surfaces on said rearward portions thereof, which support surfaces are more horizontally disposed than said upper inclined surfaces of said inner edges, to provide ledge portions for support of the stack of can ends on said blades, said blades being so disposed on said gate means as to pass between the lowermost end and the adjacent end with the stack thereof supported on said platform portion, and so that, upon movement of the gate means from a position in which said platform portion is aligned on said stacking axis to a position in which said open portion is aligned thereon, first contact of the can ends occurs on said forward portions of said blades, with said inclined surfaces of said edge portions thereof making substantially tangential contact with the curled peripheral edge portions of the lowermost end and the end thereabove, thereby urging the end apart and effecting disengagement of the lowermost end so as to permit it, upon further movement of said gate means and alignment of said open portion thereof on said stacking axis, to drop thereinto while the remainder of the stack is supported upon said ledge portions of said blades.

4,019,453

UNDERWATER VEHICLE

Vance F. Boswell, Rocky River, and Robert L. Shoemaker, Wickloff, both of Ohio, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 18, 1965, Ser. No. 508,600
Int. Cl.² B63G *8/18, 8/00*; B63C *11/48*
U.S. Cl. 114—16 R **2 Claims**



1. A submarine vehicle adapted for probing predetermined ocean depths and transporting predetermined instruments and utilization equipment while being towed by an ancilliary tractor means comprising in combination,

a hollow nose section,

an intermediate hollow shell section joined to said hollow nose section,

a hollow tail section joined to said hollow intermediate shell section,

a wing having negative lift characteristics, means interconnecting the aforesaid intermediate hollow shell section and said wing for the support thereof in a predetermined fixed relative relationship,

a pair of side plates respectively attached to the ends of said wing,

an aileron connected to the trailing edge of said wing,

means mounted on said aileron and connected to at least one of the aforesaid side plates for changing the position of said aileron with respect to said wing,

lug means connected to said intermediate hollow shell section,

means connected to the aforesaid lug means for supplying a towing force thereto,

electrical conductor means extending through the aforesaid nose section and supported by said towing force supplying means for conducting electrical energy to the hollow thereof, and

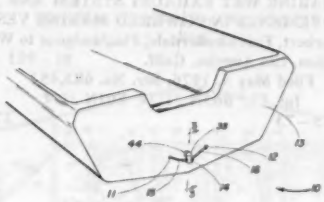
packing gland means attached to said nose section for passing said electrical conductor means therethrough in a water-tight manner.

4,019,454

BOAT PLUG APPARATUS

Joseph E. Landwerlen, Shelbyville, Ind., assignor to J & L Tool & Machine, Inc., Indianapolis, Ind.

Filed Jan. 23, 1976, Ser. No. 651,736
Int. Cl.² B63B *13/00*
U.S. Cl. 114—197 **13 Claims**



1. A boat plug apparatus which comprises:

a boat having an upwardly extending transom,

a drain hole located in the lower portion of said transom and having a circular orifice at the exterior of said transom;

an essentially spherical, semi-rigid ball having a diameter larger than the diameter of said circular orifice of said drain hole;

a first attaching means for attaching said ball to the exterior of said transom at a first point above and to one side of said circular orifice, said first attaching means including a first flexible member attached to the first point and connecting said ball to the first point; and,

a second attaching means for attaching said ball to the exterior of said transom at a second point on the opposite side of said circular orifice from the first point associated with said first attaching means, said second attaching means including a second flexible member attached to the second point and connecting said ball to the second point, whereby said ball is positioned partially within said circular orifice when water attempts to flow through said drain hole into the boat, causing an essentially water-tight seal between said ball and said circular orifice.

4,019,455

SHANK MOUNTED FOULED ANCHOR RELEASE

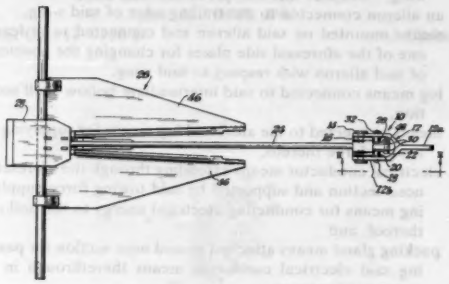
Daniel Comstock Hungerford, N. Palm Beach, Fla., assignor to Brunswick Corporation, Skokie, Ill.

Filed Jan. 28, 1976, Ser. No. 653,160
Int. Cl.² B63B *21/46*
U.S. Cl. 114—298 **19 Claims**

1. A device, mountable on a conventional anchor shank having an aperture near its free end, to provide anchor line reverse pull on the anchor when fouled comprising:

shank slide mounted around and moveably along said shank exterior surface;

means connected to said slide for attaching an anchor line to said slide;



slide stop connected to the free end of said shank; and

shearable fastening means connected to said slide and said shank for retaining said slide in a fixed position relative to said shank free end.

4,019,456

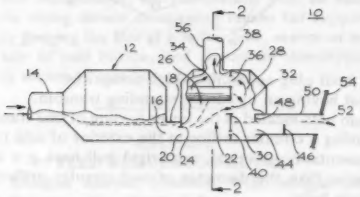
MARINE WET EXHAUST SYSTEM AND IMPROVEMENTS IN POWERED MARINE VESSEL

Earl W. Harbert, Fort Lauderdale, Fla., assignor to Whittaker Corporation, Los Angeles, Calif.

Filed May 5, 1976, Ser. No. 683,452

Int. Cl.² B63H *21/34*; F01N *3/04*

U.S. Cl. 115—73 **27 Claims**



1. An improved marine wet exhaust system comprising, in combination:

A. An exhaust gas-cooling water separation chamber having a cooling water and exhaust gas entrance, a water exit spaced downstream from said entrance and a gas exit disposed above the level of said entrance and said water exit;

B. a water deflector disposed in said separation chamber above the level of said entrance and said water exit but below said gas exit for deflecting water away from said gas exit while permitting gas to pass into said gas exit;

C. a gas dam disposed in said water exit to block the passage of gas from said chamber through said water exit;

D. A gas collection chamber connected to said gas exit and having a predetermined cross section; and,

E. gas acceleration and flow shaping conduit means connected to the downstream end of said gas collection chamber and having a portion gradually tapering downstream to provide a predetermined back pressure in said exhaust system and a terminal portion connected thereto and shaped to cause exhaust gases when exiting therefrom to penetrate the turbulent boundary layer of air associated with the periphery of a boat in motion,

said system being adapted to propel exhaust gases sufficiently far away from said boat to preclude said gases from being passed into the rear of said boat by the station wagon effect.

4,019,457

APPARATUS FOR APPLYING HOT-MELT GLUE TO EDGE OF SHEET STACK

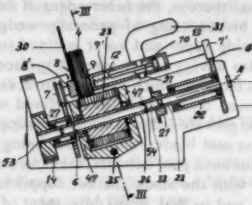
Josef Wetzler, Rosenheim-Schlossberg; August Gaschler, Rosenheim, and Heinz Hofmann, Oberwohr near Rosenheim, all of Germany, assignors to Planatolwerk Willy Hesselmann, Thansau, Germany

Filed July 2, 1975, Ser. No. 592,672

Claims priority, application Germany, July 4, 1974, 2432540

Int. Cl.² B05C *1/02*

U.S. Cl. 118—35 **10 Claims**



1. A bookbinding apparatus for applying an adhesive to the edge of a stack of sheets, said apparatus comprising:

a generally straight horizontal track having an upstream end and a downstream end;

a support surface at said upstream end and inclined at an angle of more than 8° to the horizontal;

a carriage inclined at said angle to the horizontal displaceable along said track above said surface and between said ends;

a pair of clamping elements on said carriage parallel to each other and perpendicular to said surface;

means on said carriage for displacing one of said elements toward the other element for clamping a stack of sheets therebetween with the edge of said stack lying on said surface when said carriage is at said upstream end;

a generally cylindrical applicator between said ends and rotatable about an axis substantially parallel to said surface and transverse to said track, whereby displacement of said carriage between said ends with a stack clamped between said elements will wipe said edge over said applicator; and

means including an adhesive reservoir tilted at said angle to the horizontal for applying adhesive to said applicator.

4,019,458

RESIST APPLICATION FOR SELECTIVE PLATING OF ETCHED SHEETS OF PRECISION CHEMICAL MACHINED COMPONENTS

Franz Kolterer, Los Altos, Calif., assignor to Koltron Corporation, Sunnyvale, Calif.

Filed Sept. 2, 1976, Ser. No. 719,902

Int. Cl.² B05B *13/04*

U.S. Cl. 118—321 **8 Claims**

1. A photoresist spraying apparatus for spray coating both sides of an etched metal sheet with light-sensitive photoresist comprising:

chamber means including a front wall having an opening, and a rear wall, said chamber means also including vent means located proximate said rear wall;

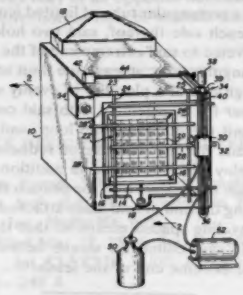
filter means for trapping excess photoresist spray, said filter means located inside said chamber means proximate said vent means and between said front wall and said vent means;

rack means for holding the metal sheet, said rack means being rotatably mounted inside said chamber means proximate said opening so as to be able to rotate **360°**;

spray means for atomizing and spraying liquid photoresist;

guide means for guiding said spray means along a predetermined path, said guide means being hingedly attached to said front wall proximate said rack means; and

positioning means for moving said spray means along said guide means whereby said spray means sprays photoresist



upon said metal sheet as said spray means moves along said guide means and whereby air flow caused by said vent means draws excess spray into said filter means.

4,019,459

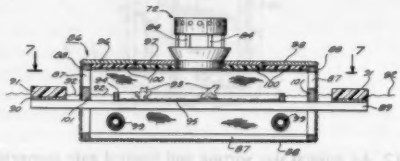
AMPHIBIAN CULTURE BY INSECT FEEDING

Gregor N. Neff, 85 Myrtle Ave., Dobbs Ferry, N.Y. 10522

Division of Ser. No. 477,839, June 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 460,619, April 12, 1974, Pat. No. 3,939,802, which is a continuation-in-part of Ser. No. 213,966, Dec. 30, 1971, abandoned. This application Feb. 20, 1976, Ser. No. 659,690

Int. Cl.² A01K *67/00*

U.S. Cl. 119—3 **8 Claims**



5. A method of frog culture comprising the steps of enclosing said frogs in a cage, partially immersing said cage in water, providing a support in said cage for said frogs to sit upon out of the water, and trapping flying insects in said cage with said frogs.

4,019,460

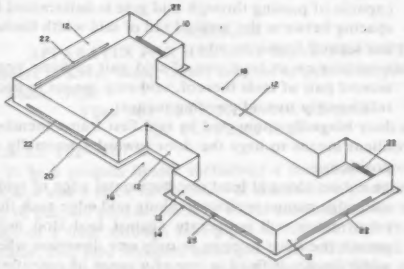
AQUARIUM TANK COVER

Louis M. Muller, 4021 Clifford Dr., Metairie, La. 70002

Continuation-in-part of Ser. No. 489,682, July 18, 1974, abandoned. This application June 30, 1976, Ser. No. 701,226

Int. Cl.² A01K *63/00*

U.S. Cl. 119—5 **10 Claims**



1. An improved cover for an aquarium tank designed with a given water level and having an open top, comprising:

a horizontally extended top member adapted to at least generally completely cover over the open top of the tank and be supported by the walls of the tank, there however being at least some small gap(s) between the sides of the tank and the corresponding facing surface(s) of said top member to allow gases to escape and air to enter;

downwardly depending flange means spaced inwardly a relatively short distance from the periphery and at least substantially around the periphery of said top member for extending down inside and inwardly around said tank and below the water level therein, said downwardly depending flange means being spaced from each other a distance close to but at least in part less than the distance walls of the tank, whereby there is a small space between said downwardly depending flange means and the sides of the tank; and

relatively small side opening means defined in said depending flange means and above said water level for permitting the escape of gases generated in said tank and the entrance of fresh air into said tank through said small space and said gap(s), whereby said cover substantially prevents the escape of water droplets from said tank without hermetically sealing it.

4,019,461

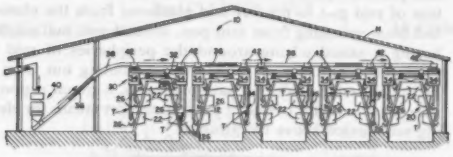
SYSTEM FOR CONTROLLING FEED OF LIVESTOCK

Everett Morgan Keen; Anthony John Siciliano, both of Vineland; Kiran Chhabildas Shah, Millville; Serge Artamonoff, Vineland, and Leonard Roy Stigen, Williamstown, all of N.J., assignors to Diamond International Corporation, New York, N.Y.

Filed Nov. 7, 1975, Ser. No. 630,015

Int. Cl.² A01K *5/02*

U.S. Cl. 119—18 **23 Claims**



19. A system for controlling the feed to be automatically distributed to livestock in numerous repeated cycles over the course of a day or like periods whereby the feed is accurately metered and dispensed comprising in combination:

a. means for segregating livestock into a plurality of groups;

b. feed receptacle means situated adjacent to said segregating means from which livestock may avail themselves of feed;

c. separate mobile feed distributing units for accurately metering and dispensing feed into feed receptacle means of the various groups;

d. power actuated drive means operatively connected to said mobile feed distributing feed units along a line generally parallel to said feed receptacle means;

e. dispensing means drivingly connected to said drive means to effect dispensing of feed from units in one direction of said driving means;

f. dispensing means of one of said units being of such capacity as to dispense in a day a total amount of feed equal to all that the livestock of a first one of said groups can eat and the dispensing means of all others of said units are each of equal capacity to each other but of less capacity than the dispensing means of said one of said one of said units by as much as from about 5% to 10% and

g. means for periodically filling each of said feed distributing units; and

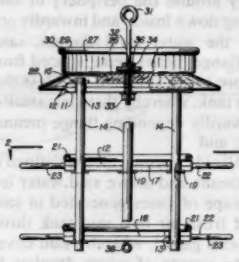
h. switching means for sensing the filled condition of said feed distributing units and facilitating actuation of said units and for sensing the unfilled condition of said feed distributing units and sounding an alarm to alert an attendant of such condition.

4,019,462

BIRD FEEDER, WATER AND BATH HANGING SUPPORT

Paul Palfalvy, 1105 Woodside Road, Redwood City, Calif. 94061

Filed Nov. 20, 1975, Ser. No. 633,621
Int. Cl.² A01K 5/00
U.S. Cl. 119—51.5 3 Claims



1. A device for feeding and watering birds comprising a plurality of platforms each formed with a plurality of holes spaced adjacent the peripheries of said platforms, the holes in said platforms being aligned, a plurality of vertical posts passing through the holes in said platform, said posts being formed with holes perpendicular to the axes of said posts, pins passing through said holes, one said pin being located below one said platform for each said post, said pins attaching said posts to said platforms, said pins being capable of removal to disassemble said device, a bath pan supported above the uppermost of said platforms, a truncated conical skirt attached to the bottom of said pan to protect said platforms from the elements and from splashing from said pan, at least one said platform having a raised edging around the peripheries of said one platform, a plurality of radial arms extending out from the peripheral edge of one of said platforms, a perch supported near the inner ends of said arms, and support means for elevating said device above the ground.

4,019,463

LEASH WITH SLIP LOOP

Earl M. Kitchen, 1025 E. Lomita St., Glendale, Calif. 91205

Filed Oct. 30, 1975, Ser. No. 627,243
Int. Cl.² A01K 27/00
U.S. Cl. 119—109 4 Claims

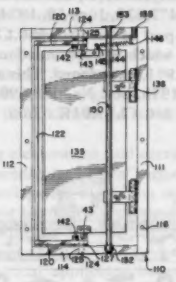
1. A leash for dogs and similar animals wherein it is desirable to have a slip loop for choking purposes to aid in control of the animal comprising; a leash, a hand loop at one end of said leash, a slip loop at the other end of said leash, and means for limiting the minimum loop size which said slip loop can be reduced to for the purpose of preventing injury to the animal, the means for limiting the minimum size of the slip loop including a connector sleeve attached to the extreme other end of said leash and having the main body portion of said leash engaged in a slidable manner therethrough, the said connector sleeve includes a rectangular tube of limited length having two holes through each side thereof, said two holes on one side being double riveted to said extreme end of the leash mounted inside the rectangular tube, at least one limit screw adjustably mounted through one of a plurality of evenly spaced holes in said leash proper for engagement with said connector sleeve to positively limit the minimum slip loop, and the connector sleeve has means for the purpose of reducing friction and reducing side play which includes an additional member riveted on the inside of the sleeve on the portion thereof opposite to the side having the end of said leash attached thereto for the purpose of providing spaced means so that the leash proper will slide inside said connector sleeve between said spacer means and said extreme end of the leash.

4,019,464

ANIMAL SIZE SORTING AND CONTROL GATE

Thomas G. Miller, R.R. 1, Box 88, Burlington, Iowa 52601

Filed June 7, 1976, Ser. No. 693,635
Int. Cl.² A01K 29/00
U.S. Cl. 119—155 12 Claims



12. An animal size sorting and control gate comprising:

a pair of vertically disposed frame members including a first frame member and a second frame member;

a pair of horizontally disposed frame members including an upper frame member and a lower frame member, said vertically disposed and horizontally disposed frame members connected together near ends thereof to define a rectangular opening therebetween;

a width limiter having a pair of horizontally disposed arms and a verical rail extending between a first pair of ends of said arms;

pivoting means near a second pair of ends of said arms for pivoting said width limiters with respect to horizontally disposed frame members;

means for fixing the width limiter in one of a range of operating positions such that the maximum width of animals capable of passing through said gate is determined by the spacing between the vertical rail of said width limiter and the second frame member;

stop means on at least one of said pair of arms near said second pair of ends thereof, said stop means in eccentric relationship to said pivoting means;

a door hingedly connected to said first frame member;

resilient means to urge the door toward a normally closed position;

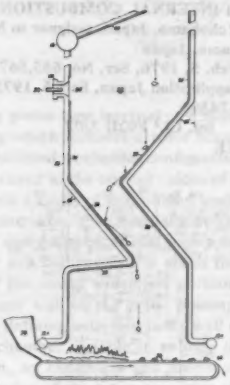
edge means along at least one horizontal edge of said door, said edge means positioned along said edge such that said edge means will cooperate against said stop means to permit the door to open in only one direction when said width limiter is fixed in one of a range of operating positions, but will allow said stop means to pass by said edge means when said width limiter is pivoted to a position whereat said width limiter is generally co-planar with said

door, thereby permitting said width limiter to be further pivoted to an opposite operating position whereat said door opens only in an opposite direction thereby reversing the direction of flow of animals through said gate.

4,019,465
FURNACE DESIGN FOR PULVERIZED COAL AND STOKER FIRING

John William Regan, Windsor, and Douglas Michael Rode, Newington, both of Conn., assignors to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed May 17, 1976, Ser. No. 687,276
Int. Cl.² F22B *31/00*; F23G *5/08*
U.S. Cl. 122—240 A **5 Claims**



1. A boiler furnace having upright walls enclosing a vertically disposed combustion chamber, a burner for pulverized coal in one of said walls adapted to project fuel for combustion into said chamber, means providing a supply of pulverized coal to said burner, a grate at the bottom of said chamber movable to define an entrance end and a discharge end for a quantity of fuel thereon, means supplying a quantity of fuel to the entrance end of said grate, and baffle means having inclined sides that flank a transverse opening intermediate the coal burner and the movable grate arranged to intercept solid products of combustion falling from the upper end of said boiler to the grate below.

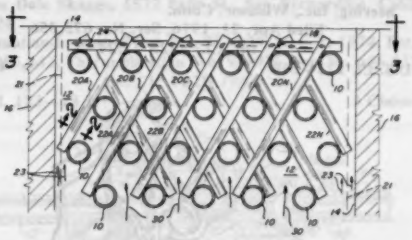
4,019,466
APPARATUS FOR RADIANT HEAT TRANSFER

Robert D. Reed, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.

Filed Nov. 3, 1975, Ser. No. 627,848
Int. Cl.² F23M *9/00*
U.S. Cl. 122—367 R **7 Claims**

1. In a process heater including; a furnace, a convection section and a stack for the flow of combustion gases, a plurality of parallel pipe sections in series connection, for the passage of a fluid through said pipes to receive heat from said heater, said pipe sections, arranged in the convection section in a plurality of vertically spaced horizontal rows defining inclined spacings from top to bottom; the improvement in means to improve the heat transfer from the combustion gases to said pipes comprising:

a plurality of thin wide straight metal strips resting within said inclined spacings against said pipes such that said

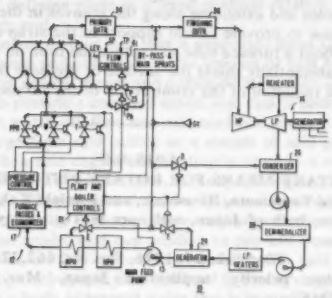


wide dimension is parallel to the flow of said gases and said thin dimension is angularly transverse to said flow.

4,019,467
VALVE SEQUENCING STARTUP CONTROL SYSTEM FOR ONCE-THROUGH BOILER

Morton H. Binstock, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 20, 1976, Ser. No. 678,526
Int. Cl.² F22B *29/12*
U.S. Cl. 122—406 ST **10 Claims**

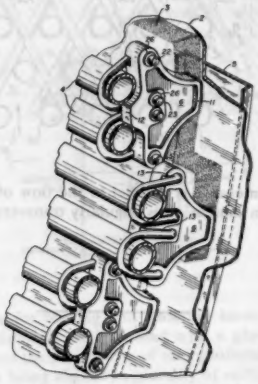


1. A startup system for a once-through boiler having a boiler feed pump for controllably driving water as a working fluid through the boiler where heat is added to the working fluid under burner control, said system comprising separator means disposed in the main boiler flow path, a plurality of valves connected in the main flow path upstream from said separator means, means for generating a demand signal representative of the difference between a predetermined boiler process pressure and a predetermined pressure setpoint, and means for controlling the operation of said valves in a predetermined opening or closing sequence in response to the pressure signal, said controlling means including respective means for driving each valve in opening or closing movement in response to the demand signal and a valve select signal, means for generating a plurality of signals indicating whether each of the respective valves is operating, and sequencer means for generating respective valve select signals for the respective valves in the predetermined sequence, said sequencer means advancing the sequence of the valve select signals to operate the next valve in the sequence when pressure demand exists and no valve is operating.

4,019,468
SUPPORT FOR FURNACE TUBES

Bert Benton Miles, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 21, 1976, Ser. No. 675,356
Int. Cl.² F22B 37/24
U.S. Cl. 122—510 4 Claims

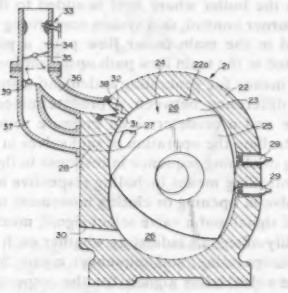


1. A support structure for furnace tubes in a furnace space, including,
a base member attached to the interior wall of the furnace space and extending its mass normal to the wall surface,
a pair of holes extended through the base member in a direction parallel the surface of the wall,
grooves in the body of the base and extending from each of the pair of holes normal the surface of the wall,
and a strap member arranged with its ends engaged in the holes and extending along the grooves in the body of the base to provide lateral support to the strap member and about a furnace tube to capture the tube on the base and substantially shield the surface of the base from the heat of radiation of the combustion of the furnace.

4,019,469
INTAKE MEANS FOR ROTARY PISTON ENGINES

Kenichi Yamamoto, Hiroshima, and Kuniaki Kakui, Minamishowa, both of Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed Feb. 27, 1976, Ser. No. 662,274
Claims priority, application Japan, Mar. 26, 1975, 50-37245
Int. Cl.² F02B 53/10
U.S. Cl. 123—8.13 8 Claims

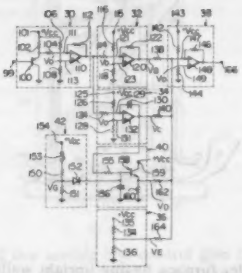


1. Rotary piston engine comprising a casing which includes a rotor housing formed with an inner wall of multi-lobed trochoidal configuration having a major axis and a minor axis and a pair of side housings secured to the opposite sides of the rotor housing so as to define a rotor chamber therein, a substantially polygonal rotor disposed in said rotor chamber for rotation and revolution with apex portions in sliding contact with the trochoidal inner wall of the rotor housing so as to define working chambers of variable volume between the inner wall of the rotor housing and flanks of said rotor, intake port means including at least one intake port formed in at least one of the side housings and opening to the rotor chamber at one of the working chambers which is in intake stroke and an intake passage formed in said one of the side housings, said intake passage including a curved portion leading to the intake port and having a radius of curvature which varies widthwise of the passage to provide varying resistance to mixture flow passing therethrough so that the mixture flow is given with a velocity component in the direction of rotation of the rotor.

4,019,470
CLOSED LOOP AIR-FUEL RATIO CONTROL SYSTEM FOR USE WITH INTERNAL COMBUSTION ENGINE

Masaharu Asano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 5, 1976, Ser. No. 655,567
Claims priority, application Japan, Feb. 6, 1975, 50-15813; June 20, 1975, 50-74300
Int. Cl.² F02D 5/02
U.S. Cl. 123—32 EE 8 Claims



1. An electronic closed loop control system for supplying an optimum air-fuel mixture to an internal combustion engine, which system includes in combination, an exhaust gas sensor for sensing a concentration of a component in exhaust gases and generating a signal representative thereof, an air-fuel ratio control unit connected to said exhaust gas sensor for deriving the signal therefrom and generating a signal indicative of an optimum air-fuel ratio based on the signal from said exhaust gas sensor, an actuator control unit connected to said air-fuel ratio control unit for deriving the signal therefrom and generating an actuator controlling signal based on at least the signal from said air-fuel ratio control unit, and an actuator connected to said actuator control unit to optimally control an air-fuel mixture to said internal combustion engine in dependence of said actuator controlling signal,
wherein an improvement comprises:
said air-fuel control unit including in combination, first means connected to said exhaust gas sensor deriving the signal therefrom to compare the same with a reference value and generating a signal representing a differential therebetween, second means including an integrator which is connected to said first means and receives the signal therefrom to integrate the same with respect to time and then generates an integrated signal, third means connected to said second means receiving said integrated signal to smooth the same, and fourth means connected to said second and third means and receiving and adding the signals from respective means, said fourth means being connected to said actuator control unit for applying its output signal thereto.

4,019,471

FUEL INJECTION TYPE ROTARY PISTON ENGINES

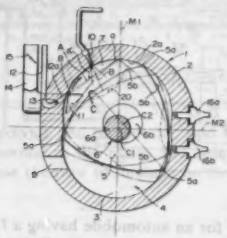
Masaharu Shimoji; Haruhiko Satow, and Atsumichi Yamasaki, all of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima, Japan

Filed Mar. 11, 1976, Ser. No. 665,874

Claims priority, application Japan, Apr. 1, 1975, 50-40034; Apr. 1, 1975, 50-40035; Apr. 2, 1975, 50-40511

Int. Cl.² F02B 53/10

U.S. Cl. 123—8.09 14 Claims



1. Rotary piston type internal combustion engine comprising a casing which includes a rotor housing having an inner wall of multi-lobed trochoidal configuration and a pair of side housings secured to the opposite sides of the rotor housing to define therein a cavity of multi-lobed trochoidal configuration having a center axis, a substantially polygonol rotor having a center axis and disposed in said cavity for rotation about its own center axis and revolution about the center axis of the trochoid of the cavity with apex portions in sliding contact with the inner wall of the rotor housing, said rotor having flanks each defining with said inner wall of the rotor housing a working chamber variable in volume through an intake, a compression, an expansion and an exhaust strokes in each cycle of rotation of the rotor, eccentric shaft means having a first portion with an axis aligned with the center axis of the rotor and carrying said rotor and a second portion offset from the first portion and having an axis aligned with the center axis of the trochoid, exhaust port means provided in said casing so as to open to the cavity at a working chamber which is in the exhaust stroke, first intake port means provided in said rotor housing so as to open to said cavity at a working chamber which is in intake stroke, first intake passage means having a longitudinal axis and leading to said first intake port means, said axis of the first intake passage means being slanted in the direction of rotor rotation at least in the vicinity of the first intake port means, second intake port means provided in at least one of said side housings so as to open to said cavity at the intake working chamber, second intake passage means leading to the second intake port means and having control valve means provided therein, means for opening said control valve means in relatively high load range of engine operation, fuel injection nozzle means having an axis and provided in said rotor housing between said first intake port means and point of intersection of said longitudinal axis of said first intake passage means with the inner wall of the rotor housing, means for supplying fuel to the fuel injection nozzle means in such a manner that the fuel is injected therefrom into the intake working chamber at a timing when point of intersection between extension of the axis of the nozzle means and the flank of the rotor is in an area of the flank which is at the leading side of rotor rotation from the center of the flank and when the angle of rotation of said eccentric shaft means is between 60° before and 75° after an orientation of the shaft wherein the rate of volume change of the working chamber is the largest, each flank of the rotor being formed with recess means in said area which is at the leading side of rotor rotation.

4,019,472

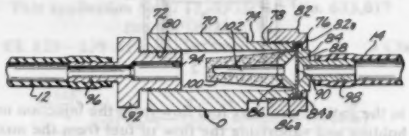
WATER INJECTION DEVICE FOR INTERNAL COMBUSTION ENGINES

William Dale Skaggs, 1572 Belle St., San Bernardino, Calif. 92404

Continuation-in-part of Ser. No. 522,029, Nov. 8, 1974, Pat. No. 3,955,542. This application Feb. 9, 1976, Ser. No. 656,437

Int. Cl.² F02D 19/00

U.S. Cl. 123—25 L 3 Claims



1. In combination with an internal combustion engine that has a carburetor with an air intake, which carburetor delivers an air-fuel mixture to said engine, a device for supplying water in the form of minute globules to said air-fuel mixture when said engine is operating to lessen the content of carbon monoxide in the exhaust from the engine, said device including:

a. a vented reservoir for water;

b. a first tube connected to the interior of said reservoir, said first tube having a first free end portion;

c. an elongate hollow housing that has first and second ends;

d. first apertured means that connect said first free end portion to said first end of said housing;

e. a second tube connected to said air intake of said carburetor, said second tube having a second free end;

f. an orifice defining plate transversely disposed adjacent said second end of said housing;

g. second apertured means that connect said second end to said second end portion of said housing and hold said orifice defining plate at a fixed position relative to said housing; and

h. an elongate porous cup that is supported from said second means and extends into the interior of said housing, said cup, second means and orifice defining plate cooperating to provide a confined space, said cup of such porosity that water will flow into said confined space and then discharge from said orifice as a stream of said globules only when said engine is operating to impress a negative pressure in said second tube, said cup serving as a filter to remove solid particles from water in said reservoir that might clog said orifice prior to said water entering said confined space, said cup tending to prevent water from said reservoir flowing to said air intake when said engine is not operating, and said confined space serving as storage for a body of filtered water that is immediately available to be formed into said globules when said engine is started and said second tube has a negative pressure therein.

4,019,473

STRATIFIED COMBUSTION TYPE ENGINE

Minoru Kamiya, 2-46-3, Minami Otsuka, Toshima, Tokyo, Japan

Filed Dec. 4, 1974, Ser. No. 529,512

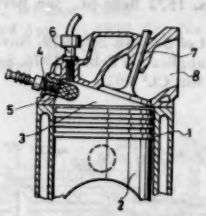
Claims priority, application Japan, Dec. 5, 1973, 48-135345; Dec. 5, 1973, 48-135346

Int. Cl.² F02B 19/10

U.S. Cl. 123—32 ST 2 Claims

1. A stratified combustion type engine comprising an engine cylinder, a main combustion chamber located above the cylinder, a spark plug within the main combustion chamber, an injection nozzle directed towards the main combustion chamber for injecting auxiliary fuel, and a cage having peripheral openings therein and a larger opening which is aligned with

the injection nozzle, the cage surrounding the spark plug tip and projectingly installed within the main combustion chamber in the path of auxiliary fuel flow from the injection nozzle for holding and vaporizing the flow of fuel from the nozzle.

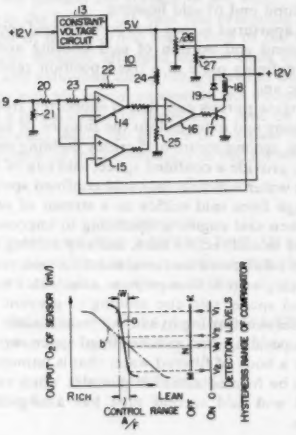


4,019,474

AIR-FUEL RATIO REGULATING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE WITH EXHAUST GAS SENSOR CHARACTERISTIC COMPENSATION

Torazo Nishimiya, Mito, and Takao Sasayama, Hitachi, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 30, 1975, Ser. No. 627,370
Claims priority, application Japan, Nov. 1, 1974, 49-125454
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EE **3 Claims**



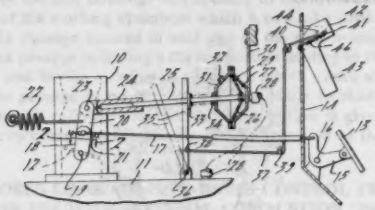
1. In an air-fuel ratio regulating apparatus for an internal combustion engine comprising fuel supply means for supplying fuel to suction means of the internal combustion engine, a combustion chamber for burning a fuel-air mixture supplied by said suction means, and detector means for detecting a specific component of exhaust emissions from said combustion chamber, said apparatus being adapted to regulate the amount of fuel supplied by said fuel supply means in accordance with the output of said detector means, the improvement comprising a first comparator having a hysteresis range and a second comparator having no hysteresis and having an operation level whose value is within the hysteresis range of said first comparator, said first and second comparators forming a circuit which receives a supply of output from said detector means for detecting the specific component of the exhaust emissions and which produces an output used for varying the volume of fuel supplied by said fuel supply means.

4,019,475

AUTOMOBILE ACCELERATION CONTROL FOR FUEL ECONOMY

Christopher Nuss, Warren, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed June 6, 1974, Ser. No. 477,125
Int. Cl.² F02D *11/08*
U.S. Cl. 123—103 E **8 Claims**



1. In a device for an automobile having a fuel and air inlet manifold and also having driver controlled throttle means for controlling the inlet flow in said manifold, means for alerting the automobile driver when the throttle means is opened too rapidly for acceptable fuel economy comprising the combination of yieldable means for opposing opening movement of said throttle means with a force detectable by said driver and being yieldable upon the application of additional throttle opening force by said driver to enable opening of said throttle means against said detectable force, and means for operatively connecting said manifold and throttle means and cooperable with said yieldable means for operating the latter to enable opening movement of said throttle means unopposed by said detectable force when the pressure in said manifold is less than a predetermined value corresponding to the extent of opening of said throttle means, said means for connecting comprising a pair of members arranged for movement in directions toward and from positions of throttle resisting relationship with respect to each other, means independent of said pressure for connecting said throttle means with one of said members for moving the latter in the directions toward and from said throttle resisting relationship in unison with opening and closing respectively of said throttle means, and reciprocating means responsive to said pressure and cooperable with the other of said members for urging the latter in the direction from said throttle resisting relationship whenever said pressure is less than said predetermined value, said yieldable means comprising means cooperable with said other member and reciprocating means for yieldingly opposing the pressure responsive operation of the latter urging said other member in the direction from said throttle resisting relationship and also for yieldingly urging said other member in the direction toward said throttle resisting relationship regardless of said pressure.

4,019,476

VAPORIZER APPARATUS

Donald M. Ackley, 1115 17th St., Hermosa Beach, Calif. 90254

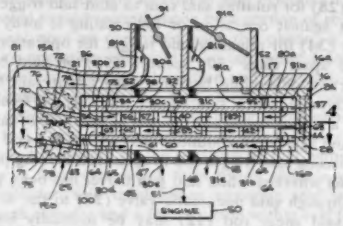
Filed Mar. 31, 1975, Ser. No. 563,693
Int. Cl.² F02M *23/02*
U.S. Cl. 123—119 DB **13 Claims**

1. In apparatus for enhancing vaporization of liquid particles entrained in a gaseous carrier,

a. means including a chamber and plates defining at least two flow paths for said carrier and particles, the carrier and particles in each path defining a flow stream, said plates extending in generally parallel and spaced apart relation, the flow paths separating and merging at opposite sides, respectively, of each plate,

b. said means including certain baffles proximate certain

plate sides causing said separating flow streams to themselves divide and combine, and other baffles proximate other plate sides causing said merging flow streams to



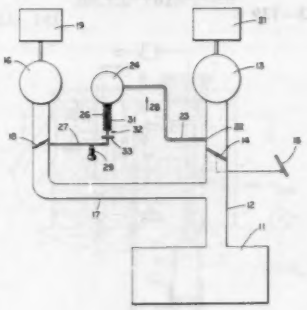
themselves divide and recombine, said baffles extending generally normal to the plates and being integral therewith to cause the flow to impinge on the baffles.

4,019,477

DUEL FUEL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Delbert L. Overton, 9011 Hibben Ave., Indianapolis, Ind. 46229

Filed July 16, 1975, Ser. No. 596,514
Int. Cl.² F02M *13/04*
U.S. Cl. 123—127 **13 Claims**



1. A dual fuel system for an internal combustion engine comprising:

primary fuel-air mixing means to produce a primary fuel-air mixture of a primary fuel and air;

auxiliary fuel-air mixing means to produce an auxiliary fuel-air mixture of an auxiliary fuel and air;

manually operable control means to control passage of the primary mixture to an intake manifold;

a vacuum source coupled to and influenced by said control means;

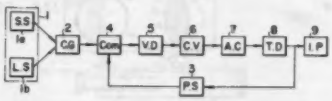
auxiliary fuel flow control means coupled to said auxiliary fuel-air mixing means and to said vacuum source for enabling increased auxiliary fuel-air mixture flow to said manifold in response to increasing vacuum above 3″Hg at said vacuum source and for decreasing auxiliary fuel-air mixture flow to said manifold in response to decreasing vacuum above 3″Hg at said vacuum source but maintaining auxiliary fuel-air mixture flow to said manifold notwithstanding source vacuum less than 3″Hg.

4,019,478

FUEL INJECTION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Nobuhito Hobo, Inuyama; Nizo Enomoto, Chita; Yutaka Suzuki, Nishio; Itsushi Kawamoto, Kariya; Michio Iyoda, Aichi; Yoshihiko Tsuzuki, Kariya; Kenro Sekino, and Hironari Nukata, both of Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Continuation of Ser. No. 381,385, July 23, 1973, abandoned.
This application Sept. 12, 1975, Ser. No. 613,017
Int. Cl.² F02M *3/00*
U.S. Cl. 123—139 AP **3 Claims**



1. A fuel injection timing control system for an internal combustion engine comprising:

a fuel injection timing control element provided in an injection pump; operating parameter detecting means for detecting the operating parameters of an engine in the form of electric signals, said detecting means including at least a speed signal generator for detecting the rotational speed of the engine and a fuel injection quantity signal generator for detecting the position of a fuel control rack of an injection pump; a control voltage generator for receiving the signals generated by said operating parameter detecting means and for generating a control voltage corresponding to a predetermined fuel injection timing control characteristic of the engine; an injection timing voltage generator for generating a voltage corresponding to the injection timing of said injection pump; a comparator for comparing said control voltage and said injection timing voltage to generate a deviation signal corresponding to the difference therebetween; and a driving circuit responsive to said deviation signal to actuate said fuel injection timing control element wherein when said fuel control rack of said injection pump reaches a predetermined position, a signal is generated by said fuel injection quantity signal generator for changing the control voltage of said control voltage generator from a control voltage corresponding to a first predetermined fuel injection timing control characteristic to a control voltage corresponding to a second predetermined fuel injection timing control characteristic of said engine.

4,019,479

APPARATUS FOR MODIFYING AN INTERNAL COMBUSTION ENGINE

Arthur Garabedian, Fullerton, Calif., assignor to Dudley B. Frank, Santa Ana, Calif.

Filed Sept. 6, 1974, Ser. No. 503,718
Int. Cl.² F02D *9/00;* **F02M** *13/04*
U.S. Cl. 123—198 F **16 Claims**

1. A split internal combustion engine having two stages of operation, said engine comprising:

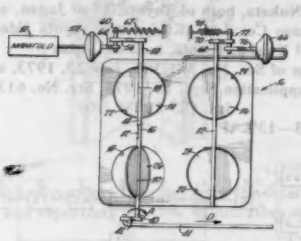
at least one primary cylinder;

at least one secondary cylinder, said primary and secondary cylinders receiving fuel and air to produce power in said engine;

a first carburetor throttle valve in fluid communication with said primary cylinder; and

a second carburetor throttle valve in fluid communication with said secondary cylinder, said first and second carburetor throttle valves respectively controlling the flow of said fuel and air to each of said primary and secondary cylinders, said first carburetor throttle valve supplying said fuel and air to said primary cylinder during both a

first stage of operation in which said engine is under relatively low load and a second stage of operation in which said engine is under relatively high load, said second carburetor throttle valve supplying said fuel and air to said secondary cylinder during only the second stage of



said two stages, said second carburetor throttle valve blocking the flow of said fuel and air to said secondary cylinder during the first stage of said two stages of operation, said secondary cylinder operating in a relatively high vacuum condition during said first stage.

4,019,480

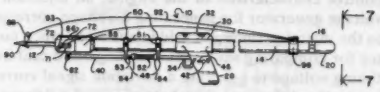
PNEUMATICALLY OPERATED SPEAR GUN

Abdulwahab Kenalo, Rte. 1, Box 385, Elkton, Fla. 32233

Filed Dec. 29, 1975, Ser. No. 644,829

Int. Cl.² F41B *11/00*

U.S. Cl. 124—61 **10 Claims**



1. A spear gun (**10**) for underwater fishing and like purposes comprising a gun barrel (**14**), a pneumatic valve means (**16, 24**) secured (**24**) to the rear end (**16**) of said barrel (**14**) permitting a desired air pressure to be provided therethrough into said barrel, a valve protecting cap (**20**) threaded over said barrel rear end (**16**), a gun stock (**28**) secured (**30, 32**) about said gun barrel (**14**), a piston (**58**) fitting snugly yet slidably within said gun barrel, said piston (**58**) having a plurality of O-ring piston grooves (**60**) and O-rings (**64**) therein spaced apart along its cylindrical surface and a lubrication groove (**62**) intermediate each pair of O-ring piston grooves (**62**) maintaining the pressure in said barrel (**14**), said discharge end of said gun barrel (**14**) being externally threaded (**49**), a cylindrical bored plug (**55**) threaded at one end on said externally threaded discharge end (**49**) of said barrel, a bored head (**56**) having its rear end threadedly secured to the other end of said plug (**55**), a spear (**13**) having a cylindrical rod extendable through said bored plug (**56**) and through said bored head (**55**) into contact with the forward end (**68**) of said piston (**58**), said spear rod (**12**) having a conically reduced portion (**84**) adjacent to but spaced from its spearing end (**94**) providing a radial shoulder (**86**) facing toward said spearing end, said spearing end being threaded (**94**) to receive and secure a harpoon hook (**96**) thereon, a V-shaped spear lock (**74**) secured in said bored head (**56**) adjacent its bore to pivot (**72**) its upper tine (**73**) against said conical portion (**84**) of said spear rod (**14**) to abut said spear rod radial shoulder (**86**) when said shoulder is positioned thereagainst, an L-shaped sear (**78**) pivotally (**76**) secured in said head (**56**) with its upper L-leg (**80**) extending into the mouth of the V of said V-shaped spear lock (**74**) and with its other L-leg (**82**) extending externally of and below said head (**56**), a trigger rod (**40**) pivoted (**83**) at one end to said externally extending L-leg (**82**), the other end of said trigger rod (**40**) providing a trigger (**34**) extendable partly (**36**) into said gun stock (**28**), an eccentric trigger locking and releasing cam (**42**) pivoted (**44**) in said gun stock (**28**) and a manually operable lever handle (**46**) secured to said cam (**42**) extending externally of said gun stock (**28**) for rotating said cam to abut said trigger (**34**) and lock it against operation or for rotating it away from said trigger (**34**) for releasing said trigger for operation, a pair of spaced apart rings (**50**) secured (**51**) on said barrel (**14**) supporting depending bearings (**48**) about said trigger rod (**40**) through which said trigger rod may be freely reciprocated, a trigger spring (**52**) biased against one of said bearings (**48**) and against an abutment (**53**) secured to said trigger rod (**40**) biasing said trigger rod to spear rod locking position (**73** and **86**) whereby when said gun barrel has been pressurized (**66**) through said pneumatic valve (**22**) to the desired pressure, said spear rod (**12**) may be manually inserted and pressed against said piston (**58**) to push said piston against the pressure (**66**) in said gun barrel (**14**) to move said spear rod (**14**) into the gun barrel (**14**) until said trigger spring (**52**) biases said sear (**78**) to actuate said spear lock (**74**) into spear rod locking position abutting against said spear rod radial shoulder (**86**), and when said trigger (**34**) is pulled, after said eccentric cam has been rotated to the trigger releasing position, said spear lock (**74**) will release said spear rod (**12**) to be ejected from said gun barrel (**14**) under the pressure (**66**) in said gun barrel (**14**), said pressure (**66**) remaining substantially unimpaired in said barrel for subsequent operations of said spear gun.

4,019,481

FUEL INJECTION SYSTEMS

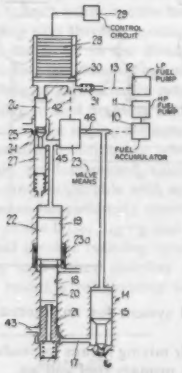
Paul Lakra, Wembley, England, assignor to C.A.V. Limited, Birmingham, England

Filed Mar. 4, 1976, Ser. No. 663,852

Claims priority, application United Kingdom, Mar. 7, 1975, 9519/75

Int. Cl.² F02M *51/00*

U.S. Cl. 123—139 E **12 Claims**



1. A fuel injection system for supplying fuel to internal combustion engines, the system comprising an accumulator in which fuel is stored at a high pressure, pump means for charging the accumulator with fuel, a piston slidable within a cylinder, a fuel outlet from one end of the cylinder, said fuel outlet in use communicating with the inlet of an injection nozzle of the engine, valve means operable to place the other end of the cylinder in communication with said accumulator when it is desired to deliver fuel to the engine, said valve means when open allowing fuel to flow from the accumulator to said other end of the cylinder to cause displacement of said piston thereby to expel fuel from said one end of the cylinder, a stack of piezo electric crystals arranged when energised to generate a control pressure which is applied to a second piston forming

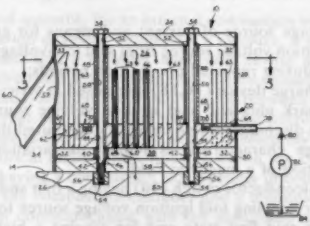
part of said valve means to operate said valve means, an electrical control network for controlling the operation of said stack of crystals in timed relationship with the associated engine, said valve means comprising a second cylinder, said second piston being slidably located in said cylinder, a valve head connected to said second piston by a portion of reduced cross sectional area as compared with the piston, a valve seating for co-operation with said head, an outlet from said second cylinder intermediate the piston and the valve head, said outlet being connected to said other end of said first mentioned cylinder, said valve head being exposed to the pressure of fuel within the accumulator so that the valve head is forced onto the seating by the pressure of fuel within the accumulator, a third cylinder, a third piston slidable within said third cylinder, said third piston engaging said second piston, a fourth cylinder and a fourth piston within said fourth cylinder, said fourth piston engaging said third piston and at its end remote from said third piston being subjected to the fuel pressure within said accumulator, the area of said second and fourth pistons being substantially equal and also substantially equal to the seat area of the valve head, the area of said third piston being less than that of the fourth piston, said control pressure being applied to the presented faces of said second and third pistons and means for supplying a backing pressure to the presented faces of said third and fourth pistons, the control pressure when the stack of crystals is energised, being higher than said backing pressure but falling to a value less than the backing pressure when the crystals are de-energised, the arrangement being such that upon energisation of the crystals, the valve head will be moved away from the seating to permit flow of fuel from the accumulator to said first mentioned cylinder.

4,019,482

FUEL SEPARATOR

Rocco J. Pugliese, 501 Emmons, Lincoln Park, Mich. 48146

Filed Feb. 5, 1976, Ser. No. 655,520
Int. Cl.² F02B 25/06
U.S. Cl. 123—141 **7 Claims**



1. A fuel separating device adapted to be connected between a carburetor and an intake manifold of an internal-combusion engine for removing excess fuel from the fuel-air mixture provided by said carburetor, said device comprising:

a housing having upper and lower chambers;

plate means separating said chambers;

an inlet port for communicating with said upper chamber and adapted to be connected to the outlet of said carburetor for communicating the fuel-air mixture from said carburetor to said upper chamber;

an outlet port communicating with said lower chamber and adapted to be connected to the inlet of said manifold for communicating said fuel-air mixture from said lower chamber to said intake manifold;

a plurality of upright tubular members extending through said plate means, one end of each of said tubular members terminating in the upper regions of said upper chamber, the other ends of said tubular members opening into said lower chamber to provide a fluid flow passage for directing said mixture from said carburetor to said manifold while excess fuel droplets carried by said air-fuel mixture drop to the bottom of said upper chamber; and

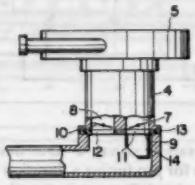
means associated with said upper chamber for drawing off said excess fuel which accumulates therein.

4,019,483

FUEL SYSTEM FOR MULTICYLINDER ENGINES

Toshiaki Konomi; Jyoji Nurita, and Takeshi Masuda, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed July 15, 1974, Ser. No. 488,278
Claims priority, application Japan, Nov. 7, 1973, 48-124475
Int. Cl.² F02M 29/00
U.S. Cl. 123—141 **9 Claims**



1. A duplex carburetor system comprising a primary barrel, a secondary barrel disposed on one side of said primary barrel laterally spaced therefrom, each of said primary and secondary barrels including a downstream end, intake manifold means in flow communication with both said downstream ends of said primary and secondary barrels arranged to direct flow from said downstream end of said primary barrel laterally in a direction toward said downstream end of said secondary barrel, a hollow cylindrical member having a first end attached in flow communication with said downstream end of said primary barrel and a second end extending into said intake manifold means, said primary barrel and said cylindrical member each including a central axis and being in general axial alignment with each other, a deflector attached to said cylindrical member adjacent said second end thereof and arranged on a side of said cylindrical member laterally remote from said secondary barrel, said deflector extending transversely to the axis of said cylindrical member and terminating at an edge extending chordally of said cylindrical member and spaced inwardly from the side of said cylindrical member closest to said secondary barrel, with said side of said cylindrical member closest to said secondary barrel being cut along a plane extending obliquely to the axis of said cylindrical member and passing through said edge, said plane also extending through a portion of said cylindrical member located upstream of said edge and forming an opening defined by said edge and said upstream portion of said cylindrical member, said opening facing in the direction of said secondary barrel.

4,019,484

IGNITION APPARATUS FOR INTERNAL COMBUSTION ENGINE

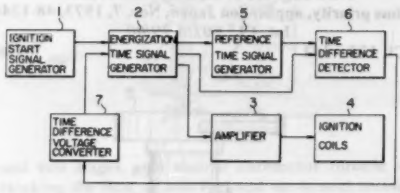
Yasunori Mori, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Feb. 10, 1975, Ser. No. 548,800
Claims priority, application Japan, Feb. 12, 1974, 49-16209; Apr. 30, 1974, 49-47671
Int. Cl.² F02P 1/00
U.S. Cl. 123—148 E **4 Claims**

1. In an ignition apparatus for an internal combustion engine comprising a direct current potential source, an ignition coil having a primary winding, an energizing circuit including a switching transistor for controlling an energizing current through said primary winding, an ignition signal generator for producing an alternating current ignition signal in timed relationship with the rotation of an engine, and an energization

time duration signal generator means for generating an energization time during signal in means for generating an energization time during signal in synchronism with said alternating current ignition signal, and wherein said energizing circuit for operating said switching transistor feeds said energizing current to said primary winding at the beginning of said energization time duration signal and breaks said energizing current at the end of said energization time duration signal;

the improvement comprising means for producing a reference time duration signal in synchronism with said energi-



zation time duration signal, a time duration difference detector means for producing a duration difference signal proportional to the difference in length of time duration between said reference time duration signal and said energization time duration signal, a feed back means to negatively feed back said time duration difference signal to said energization time duration signal generator means thereby minimizing the difference in length of time duration between said energization signal and said reference time signal.

4,019,485

FLYWHEEL MAGNETO HAVING CAPACITIVE IGNITION SYSTEM

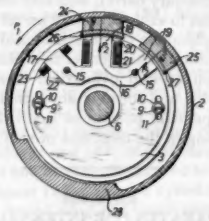
Hans Thorsten Henrik Carlsson, Amal, Sweden, assignor to Aktiebolaget Svenska Electromagneter, Sweden

Continuation of Ser. No. 269,764, July 7, 1972, abandoned. This application Aug. 14, 1974, Ser. No. 497,296

Claims priority, application Sweden, Dec. 3, 1971, 15572/71

Int. Cl.² F02P 1/00

U.S. Cl. 123—148 E **2 Claims**



1. An ignition system comprising:

a. a flywheel having a plurality of permanent magnets with pole faces directed toward the rotational axis of the flywheel;

b. a ferromagnetic coil disposed inside said flywheel and comprising superimposed laminations, each individual lamination having three pole legs whose ends are disposed adjacent to the rotational path of said pole faces;

c. a charging coil disposed on the intermediate pole leg of said coil core;

d. a trigger coil disposed on the last leg of said coil core when viewed in the direction of rotation of the flywheel;

e. a charging circuit including said charging coil, a rectifier, a storage capacitor, and the primary winding of an ignition transformer, all connected together in a single series, said transformer having a secondary winding adapted to be connected in circuit with a spark plug;

f. a thyristor connected by its anode and its cathode across a portion of said charging circuit including the series-connected capacitor and the primary winding; and

g. means connecting one end of said charging coil to the anode of said thyristor, the other end of said charging coil being connected (1) through said trigger coil and a diode to the control terminal of said thyristor, and (2) through a resistor to said control terminal.

4,019,486

MOTOR IGNITION SYSTEM WITH MAGNETICALLY SELECTABLE GAS DISCHARGE DEVICES

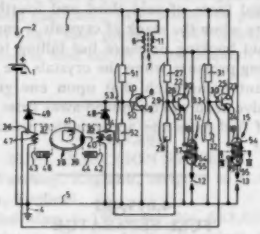
Gert Siegle, Sperlingsstieg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 14, 1974, Ser. No. 523,867

Claims priority, application Germany, Nov. 16, 1973, 2357188

Int. Cl.² F02P 1/00

U.S. Cl. 123—148 E **10 Claims**



1. In an ignition distribution system for a multi-cylinder internal combustion engine having a plurality of spark plugs arranged to receive their ignition voltage selectively from a common source, the improvement comprising the combination of:

a low-voltage source of current and means for energizing said ignition voltage source from said low-voltage current source during repeated pre-ignition periods;

a gas discharge device (16,18) interposed in series between each spark plug and said ignition voltage source, each said gas discharge device being so constituted that its gas discharge characteristic is subject to variation by the application of a magnetic field;

a first semiconductor switch (10) having a first and a second state for enabling said ignition voltage source to be energized in said first state and for causing a high voltage discharge from said voltage source in said second state;

means (35,37,38,48,49,53) controlled by the rotation of said engine for changing the state of said switch (10) from said first state to said second state at moments corresponding respectively to predetermined positions in a rotary cycle of said engine, for thereby initiating a discharge in a selected spark plug, and for restoring the state of said switch (10) to said first state promptly after said discharges are completed, and

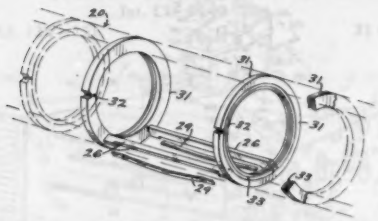
means controlled by the rotation of said engine (35,37,38,29,33,22,25,17,19) for selectively applying, by current from said low-voltage source, a magnetic field in turn to each of said gas discharge devices without immediately producing a discharge therein upon the application of said field, and for applying said field in each case for a predetermined engine-rotation-controlled period beginning prior to one of said position corresponding moments and ending after the state of said first switch is next restored to said second state, said field applying means including a plurality of additional semiconductor switches (22,25) and a coil (17,19) individually encir-

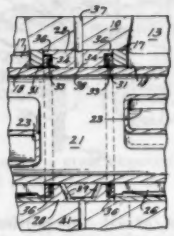
cling each of the respective gas discharge devices (16,18) and arranged for switching in succession to said low-voltage current source through one of said additional switches.

4,019,487
ROTARY VALVE SEAL ASSEMBLY

William D. Guenther, Hagerstown, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Nov. 26, 1975, Ser. No. 635,713
Int. Cl.² F01L 7/00
U.S. Cl. 123—190 E 16 Claims





1. A seal assembly for an internal combustion engine having a combustion chamber defined by a cylinder, a piston within the cylinder and a cylinder head and having a cylindrical, driven valve rotor adjacent the combustion chamber for establishing timed, sequential communication between the combustion chamber and a manifold through a diametrically extending passage to the valve rotor, said seal assembly comprising:

a cylindrical hollow rotor housing within the cylinder head and having a combustion side opening in communication with the combustion chamber and a manifold side opening in communication with the manifold, said openings being aligned for registry with the valve rotor passage upon rotation of the rotor;

first seal means within said housing, extending along the axis of the cylindrical valve rotor and located adjacent the axial lengths of each of said combustion side openings, said seals comprising a sealing surface in sealing contact with an outer wall of the valve rotor and having means for biasing said sealing surface against the rotor wall;

second seal means adjacent opposite ends of said housing and extending about the circumference of the valve rotor adjacent opposite ends of each of said combustion side openings and in abutting contact with ends of said first seal means; said second seals comprising an inside sealing surface in sealing contact with the outer wall of the valve rotor and means for inwardly biasing said sealing surface against the rotor wall;

a generally cylindrical hollow rotor bearing adjacent each opposing end of said rotor housing and in rotatively supportive engagement with said rotor;

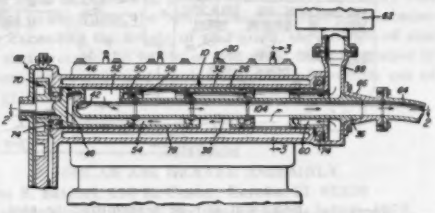
means for spacing apart said bearing and said housing and for spanning said second seal whereby said second seal is free for axial movement on the rotor; and

means for axially biasing each of said second seals against said rotor housing.

4,019,488
ROTARY VALVE ENGINE WITH LUBRICATOR

Alphonse E. Kremer, 1900 E. Beach Blvd., Gulfport, Miss. 39501

Continuation-in-part of Ser. No. 398,789, Sept. 19, 1974, abandoned. This application Dec. 20, 1974, Ser. No. 534,868
Int. Cl.² F01L 7/00
U.S. Cl. 123—190 BB 8 Claims



1. In an internal combustion engine having one or more cylinders, each cylinder having one port in the combustion chamber for the admission of air or combustible mixture and the discharge of combustion products, said engine having a rotary valve mechanism with a stationary sleeve communicating with the ports, a rotary member disposed in said sleeve and being rotatably driven, said rotary member comprising concentrically arranged and spaced inner and outer tubular members with the inner tubular member defining an exhaust passage and the annular space between the inner and outer tubular members defining an intake passage, said outer tubular member including an intake port for alignment with the port in communication with the combustion chamber, said inner tubular member including a radially extended passageway extending to the periphery of the outer tubular member is isolated relation to the annular space for communication with the port in the combustion chamber for selectively admitting air or a combustible mixture into the combustion chamber and discharging exhaust products therefrom through the port in the combustion chamber, said inner tubular member defining the exhaust passage and the annular space defining the intake passage being substantially straight throughout the length thereof, said inner tubular exhaust member being made in sections connected together with expansion joints, said outer tubular member being constructed of unitary construction, said expansion joints enabling transverse and longitudinal expansion of the inner tubular member thereby eliminating distortion of the outer tubular member due to differences in expansion and contraction.

4,019,489
SAFETY APPARATUS FOR ENGINES

George Bowen Cartmill, 43 Conifer St., Alderley, Queensland 4051, Australia

Filed Dec. 8, 1975, Ser. No. 638,559
Claims priority, application Australia, Dec. 9, 1974, 9943/74
Int. Cl.² F02B 77/08
U.S. Cl. 123—198 D 11 Claims

1. Monitoring and control apparatus in combination with a marine engine including:

a. flow detection means for monitoring the engine's coolant flow;

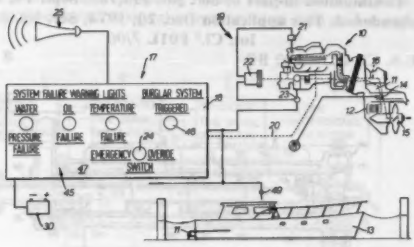
b. temperature detecting means for monitoring the engine temperature;

c. signal means associated with said flow detecting means and said temperature detecting means and adapted to transmit a signal upon detecting an abnormal operating condition of said coolant flow or said temperature;

d. alarm means associated with said signal means and activated upon receipt of a signal for said signal means;

e. automatic engine speed control assembly for reducing the speed of said marine engine upon receiving an operative signal from said signal means;

f. time delay means interposed between said signal means and said speed control assembly and arranged so that an



operative signal will not be transmitted to said speed control assembly until said abnormal operating condition continues for a predetermined period of time, and

g. manually operable override means operable to prevent actuation of said speed control assembly upon existence of said abnormal operating condition for a period longer than said predetermined period of time.

4,019,490

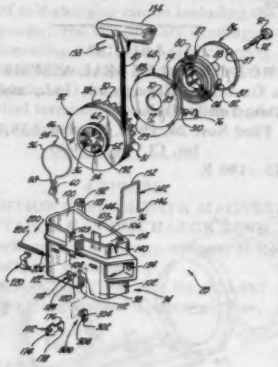
PULL-ROPE RECOIL STARTER

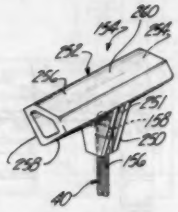
Paul T. Reese, New Holstein, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed May 9, 1975, Ser. No. 576,199
Int. Cl.² F02N 1/00
U.S. Cl. 123—185 A **68 Claims**

1. A pull-rope recoil starter for an internal combustion engine which has a first starter gear operatively coupled to an engine crankshaft, said starter comprising support means fixedly attached to said engine and having a pair of spaced slots extending in the direction of said first starter gear, engine cranking means including a second starter gear and having shaft means axially extending between said slots and slidably journalled therein for rotation about the axis of said shaft and bodily movement in a direction transverse to said axis, rope winding means operatively coupled to said second gear, a pull rope extractably wound upon said rope winding means for activation of said starter by an operator, said engine cranking means being responsive to pulling on said rope by an operator to translate said second gear in said slots into engagement with said first gear, continued pulling on said rope causing corotation of said starter gears to crank said engine, a recoil spring encircling said shaft axis and having an inner end operatively connected to said engine drive means, and a spring anchor operatively connecting an outer end of said recoil spring to said engine such that said recoil spring acts to translate said second gear in said slots out of engagement with said first starter gear when said rope is released by the operator.

44. A pull-rope handle comprising a T-shaped body having a hollow stem adapted to encompass a pull-rope and a head having oppositely projecting wings, each of said wings having a handle gripping surface which is substantially V-shaped in





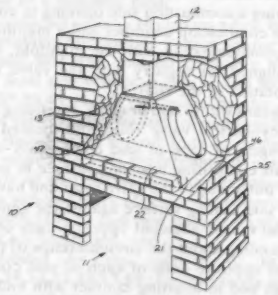
cross section axially of said wings proximate to and contiguous with said stem.

4,019,491

NO DOWN DRAFT CHIMNEY THROAT

Nicholas DiRocco, P.O. Box 3428, Incline, Nev. 89450

Filed Apr. 7, 1975, Ser. No. 565,724
Int. Cl.² F24B 1/18
U.S. Cl. 126—120 **2 Claims**



1. A no down draft chimney throat located beneath a chimney flue comprising: a chimney hood assembly containing no damper lid; and an air shelf consisting of a trough and located within the chimney hood assembly with one side and two ends adhering to said chimney hood assembly and one side not adhering to said chimney hood assembly so as to provide a passage for smoke between the said assembly and said non-adhering side, wherein the non-adhering side edge is posi-

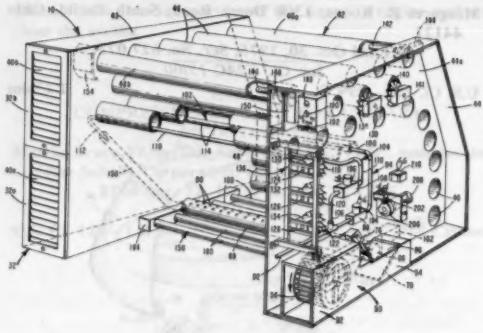
tioned outside an imaginary vertical line drawn down the opening of the chimney flue so that water or debris or air coming down the chimney flue will not directly strike the outer edge of said non-adhering side, and wherein the said trough is provided with a cleaning hole adjacent its lower portion, the said cleaning hole being cooperative with another hole located in the outside of the chimney.

4,019,492

METHOD AND APPARATUS FOR AUTOMATIC FURNACE

Joseph A. Rush, 26121 Cornor Drive, Damascus, Md. 20750

Filed Feb. 4, 1975, Ser. No. 547,085
Int. Cl.² F24B *7/04*
U.S. Cl. 126—121 **21 Claims**



1. In a furnace having a grate disposed therein and a heat exchanger disposed about the grate, the improvement comprising:

a. at least one perforated air delivery tube in communication with said heat exchanger for supplying combustion air to said furnace;

b. duct means forming a part of said heat exchanger for supplying air to said perforated air delivery tube; and

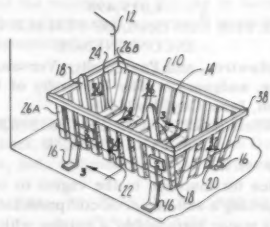
c. damper means in said duct means dor supplying air to said perforated air delivery tube for adjusting the amount of air communicated to said perforated air delivery tube, said damper means operating in response to predetermined temperatures existing within said furnace.

4,019,493

GUARD FIXTURE FOR A FIREPLACE GRATE

Edward R. McCullough, 1219 Irving, Royal Oak, Mich. 48067

Filed Mar. 8, 1976, Ser. No. 665,048
Int. Cl.² F23H *13/02*
U.S. Cl. 126—165 **3 Claims**



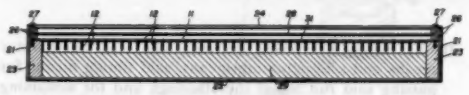
1. For use in combination with a fireplace grate of the type having a frame formed of a plurality of spaced, substantially parallel rib members which extend fore and aft when placed in a fireplace opening and in application are supportive of a plurality of logs arranged in a stacked reltionship, said ribs being substantially perpendicular to the axes of extension of said logs, a guard fixture comprising: an elongate post of substantially greater length than width; a first flange plate integrally fixed to the elongate post at one end thereof and of greater width than said post; a second flange plate separate from said post and of greater width than said post, the first and second flange means each being of width greater than the spacing between adjacent rib members, and adapted to abut opposed sides of a pair of adjacent rib members; and fastener means extending between the flange plates for fastening the first and second flange plates in abutting relation with the pair of adjacent rib members whereby said post is affixed to the frame so as to cause it to project substantially upwardly with respect to the frame, the vertical height of said post substantially exceeding the height of said grate, the portion of said post that exceeds the height of said grate being operative to prevent logs within said stack from rolling forwardly out of said grate.

4,019,494

SOLAR AIR HEATER ASSEMBLY

Yahya B. Safdari, 610 E. Center, Eureka, Ill. 61530

Continuation-in-part of Ser. No. 594,532, July 9, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,400
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **12 Claims**



1. A heat exchange plate adapted for heat transfer to a stream of fluid moving in a direction generally parallel to and in contact with a face of said plate, comprising:

a generally flat heat-conducting base plate;

a plurality of flat thin heat-conducting fins attached to and extending outwardly from said face of said base plate;

said fins being arranged in a plurality of adjacent rows transverse to the direction of fluid flow, all of the fins in a row being generally parallel to the direction of fluid flow, the lateral spacing between adjacent fins in all rows being substantially constant, each row of fins being laterally displaced in one direction from the adjacent upstream row;

the lateral spacing between adjacent fins in a row being S, the length of the fins being about 0.75 S to 5.0 S, the height of the fins being about 1.0 S to 5.0 S, and the lateral displacement between fins in adjacent rows being about 0.1 S to 0.5 S.

4,019,495

CONTROL SYSTEM FOR SOLAR HEATER

Clive A. Frazier, 5325 Curry Ford Road A-203, and Marion L. Cunningham, 3210 Wickersham Ct., both of Orlando, Fla. 32806

Filed Dec. 29, 1975, Ser. No. 644,928
Int. Cl.² C24J *3/02*
U.S. Cl. 126—271 **17 Claims**

1. A system for controlling the flow of a liquid through a solar heating system of the type having the output of a solar energy collector coupled to the input of a storage tank and having a circulating pump interposed along a return liquid pipe coupled between the recirculating output of the storage tank and the input of the solar energy collector, the control system comprising in combination:

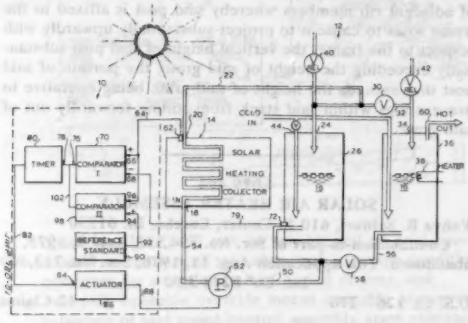
first temperature means for sensing the temperature of said liquid adjacent said output of said solar energy collector, said first temperature means generating a first signal responsive thereto;

second temperature means or sensing the temperature of said liquid at a second location within said solar heating

system, said second temperature means generating a second signal responsive thereto;

first comparator means, coupled between said first and second temperature means, for generating a run signal responsive to the difference between said first and second signals exceeding a predetermined level;

actuating means for powering said circulating pump responsive to said run signal, whereby said liquid is circulated within said solar heating system; and



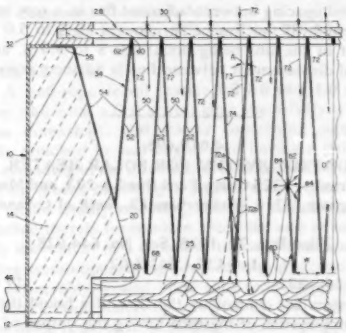
timing means interposed between said first comparator means and said actuating means, said timing means for passing said run signal therethrough and for sustaining said run signal therethrough for a minimum time period if the duration of said run signal should be less than said minimum time period, whereby said circulation pump when activated will be powered for at least said minimum time period.

4,019,496

COLLECTING SOLAR ENERGY

Richard Daniel Cummings, Reading, Mass., assignor to Daystar Corporation, Burlington, Mass.

Filed Apr. 7, 1975, Ser. No. 565,439
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **12 Claims**



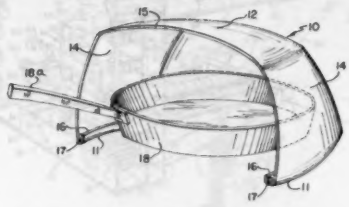
1. In a solar-to-thermal energy converter comprising an insulated frame, a solar energy absorber mounted in said frame, fluid flow heat exchanger means thermally coupled to said absorber to carry away as thermal energy the absorbed solar energy, and a window transmissive to solar energy mounted in said frame and spaced from said absorber, that improvement consisting of a heat loss suppressor comprising a multiplicity of walls extending between said window and said absorber, adjacent said walls being at least in part non-parallel to each other to define a first set of elongated channels generally diverging and opening toward said window interleaved with a second set of elongated channels generally diverging and opening toward said absorber, said walls being of material transmissive to solar energy and absorptive of thermal energy, adjacent said walls being at an acute angle to each other so that, (a) when said converter is installed with said channels extending generally parallel to an east-west arc, incoming sun rays passing through said window and impinging upon said walls will be split into a major transmitted component directed toward said absorber and a minor reflected component also directed toward said absorber, (b) said channels will be narrow enough to substantially reduce convection heat loss, and (c) said channels will be deep enough to substantially reduce radiation heat loss.

4,019,497

FRYING PAN GREASE SHIELD

Margaret R. Koons, 1300 Dorsh Road, South Euclid, Ohio 44121

Filed Oct. 30, 1975, Ser. No. 627,073
Int. Cl.² F24C *15/00*
U.S. Cl. 126—299 C **1 Claim**



1. A frying pan grease shield consisting of an integral imperforate hollow shell having a planar open bottom edge and a top, and one end wall and two generally parallel side walls connected with said top and extending to said bottom edge, and the end opposite said one end being entirely open between said bottom edge and said top and side walls, and a continuous grease accumulation trough bent smoothly inward and then upward around said bottom edge along said side walls and one end wall, said trough having a continuous open top along its entire length and having partitions closing the ends of said trough at the open end of said shield, said shield sloping slightly outwardly and downwardly from the front center of said top to said side walls and end wall, and sloping outwardly and downwardly from top to bottom edge of said side walls and end wall to said trough sufficiently to cause gravity flow of hot grease along said walls to said trough.

4,019,498

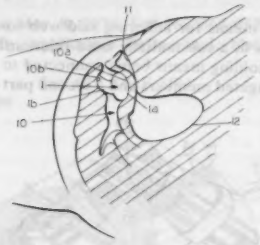
DEVICE FOR CONTROL OF FEMALE URINARY INCONTINENCE

Charles E. Hawtrey, and Paul Walter Vervais, both of Iowa City, Iowa, assignors to The University of Iowa Research Foundation, Iowa City, Iowa

Filed June 27, 1975, Ser. No. 590,892
Int. Cl.² A61B *19/00*
U.S. Cl. 128—1 R **7 Claims**

1. A device for insertion in the vagina to control incontinence comprising a solid mass of compressible cellular material having a major surface and a portion which extends to a selected distance away from said major surface, said device being of high enough compressibility and said distance being selected so that when said device is compressed and inserted in the vagina with said major surface contacting the anterior wall thereof and underlying a portion of the uretha, said portion firmly contacts the opposed wall of the vagina, and the

device remains partially compressed between said anterior wall and said opposed wall with sufficient force to upwardly



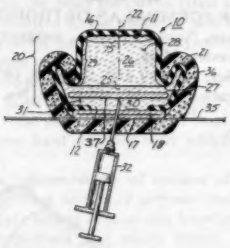
distend the contacted portion of the anterior vagina wall to close the uretha.

4,019,499

COMPRESSION IMPLANT FOR URINARY INCONTINENCE

Martin Bruce Fitzgerald, Santa Barbara, Calif., assignor to Heyer-Schulte Corporation, Goleta, Calif.

Filed Apr. 22, 1976, Ser. No. 679,250
Int. Cl.² A61B *19/00*
U.S. Cl. 128—1 R **12 Claims**



1. A compression implant to resist flow of urine through the urethra comprising: a flexible cap; and external pressure face on the cap; a base; a peripheral wall continuously interconnecting the cap and the base; a peripheral fold in the peripheral wall enabling the face to move toward and away from the base by changing the shape of the fold without stretching the material which forms the wall; the cap, base and peripheral wall defining an internal cavity; fluid-like material in the cavity including the portion of the cavity contiguous to the base, whereby the spacing apart of the face and base can be determined by selection of the amount of said fluid-like material in the cavity, and the resistance of the cap to force exerted on the pressure face which tends to move it toward the base can similarly be determined.

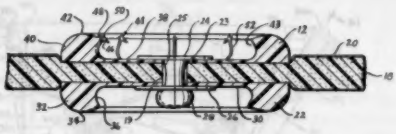
4,019,500

SPONGE RETAINING CUP FOR MEDICAL ELECTRODE

Charles T. Patrick, Jr., Centerville, Ohio, and David W. King, Connersville, Ind., assignors to NDM Corporation, Dayton, Ohio

Filed May 27, 1975, Ser. No. 580,622
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.1 E **3 Claims**

1. In an electrode cup having a base and a rim defining a cavity for receiving a prefilled electrolyte sponge, said electrode cup having a conductive element attached to said base and communicating with the interior of said cup for transmitting an electrical signal to or from said sponge, barb means affixed to said rim and sufficiently sloping downwardly toward the base of said cup for guiding said sponge when deposited thereon in free sliding movement toward the base of said cup



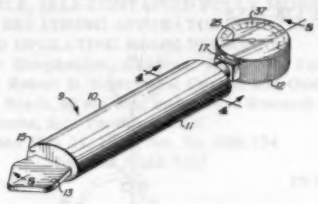
for contact with said conductive element, said barb means poised for snagging said sponge to prevent removal of said sponge from said cup after said sponge has slid on said barb means to the base of said cup.

4,019,501

CPR BREASTPLATE COMPRESSION AID

Jack R. Harris, 2606 W. Wolf St., Phoenix, Ariz. 85017

Filed Feb. 20, 1976, Ser. No. 659,673
Int. Cl.² A61H *1/00*
U.S. Cl. 128—24 R **8 Claims**



1. A breastplate compression aid for placement on the chest of a human victim over the victim's sternum comprising:

an elongated compressible hollow member having approximately the length and shape of the sternum of an adult person,

said member defining a closed hollow chamber along its length having substantially an oval cross-sectional configuration,

a pressure gauge attached at one end of said member in fluid pressure contact with the hollow interior of said member,

the other end of said member being provided with means for indicating the position of the base of the victim's sternum,

fluid means for filling said chamber,

whereby when said aid is placed on the body of a victim over the sternum with the longer dimension of said chamber co-planar with the surface of the victim's body and pressure is applied to said member, it will be transferred to the victim's sternum and a representation thereof indicated on said gauge.

4,019,502

HYDROTHERAPY DEVICES

Christopher W. Elkins, Fort Collins, Colo., assignor to Teledyne Water Pik, Fort Collins, Colo.

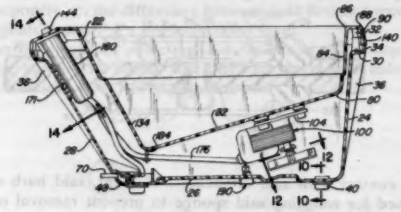
Filed Mar. 22, 1976, Ser. No. 669,283
Int. Cl.² A61H *9/00*
U.S. Cl. 128—65 **14 Claims**

1. A hydrotherapy device comprising:

a generally tub-shaped lower housing having an upper rim;

a generally tub-shaped upper housing of resilient material and nested within said lower housing and having an upper periphery matable with said rim, the bottom wall of said upper housing being spaced from the bottom wall of said lower housing when said housings are nested together;

means for fastening said rim to said periphery as the only support of said upper housing;



and vibratory means secured to a wall of said upper housing and disposed between the respective walls of said housings.

4,019,503

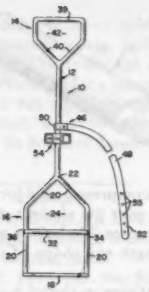
CRADLE ASSEMBLY

Willie R. Smith, Rte. 2, Box 255, Inverness, Fla. 32650

Filed Dec. 1, 1975, Ser. No. 636,530

Int. Cl.² A61F *5/04*

U.S. Cl. 128—83.5 **10 Claims**



1. A cradle assembly of the type primarily for positioning a limb disposed in a cast structure, said cradle assembly comprising base means extending in interconnecting disposition between opposite end portions of said cradle assembly, stirrup means substantially defining one end of said cradle assembly, handle means connected to said base means at the substantially opposite end of said base means relative to said stirrup means, said base means comprising a rigid shaft element disposed in integral, interconnected relation between said stirrup means and said handle means, said stirrup means comprising an aperture means, said aperture means including a predetermined dimensioned configuration, whereby said stirrup means is disposed at least partially in surrounding relation to a portion of the casted limb.

4,019,504

MEDICAL SPLINT KIT

Robert E. Sterling, 210 Brom Bones Lane, Longwood, Fla. 32750

Filed May 7, 1975, Ser. No. 575,577

Int. Cl.² A61F *5/04*

U.S. Cl. 128—88 **13 Claims**

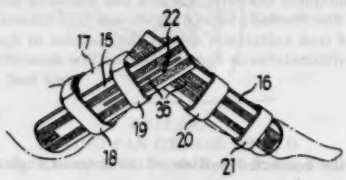
1. An emergency medical-splint kit for application to an injured body portion at the site of an accident comprising:

a. two substantially rigid elongated members substantially transparent to X-irradiation;

b. fixing means for retaining said members adjacent to each other and in a substantially fixed relationship, said fixing means permitting changes in the relationship with which said members are affixed to each other;

c. at least one web of sufficient dimension to wrap around a body portion for affixing said members adjacent to a body portion;

d. holding means for adhering said web to said elongated members in a substantially fixed relationship, a first part of said holding means being connected to at least one of said elongated members and a second part of said holding means being connected to said web, said holding means allowing said web to be adhered to and removed from said one elongated member a plurality of times; and



e. joining means forming part of said web means for, with said holding means adhering said web means to said elongated member and with said web means wrapped around said elongated member and a body portion, adjoining together two parts of said web means to affix said member adjacent to a body portion.

4,019,505

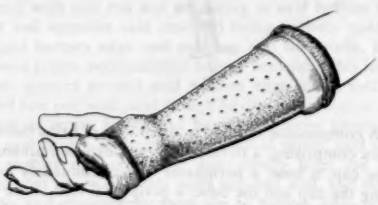
METHOD OF FORMING AN ORTHOPEDIC CAST

Lloyd H. Wartman, Norwalk, Conn., assignor to Norman S. Blodgett, Worcester, Mass.

Continuation of Ser. No. 510,448, Sept. 30, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 623,736

Int. Cl.² A61F *5/04*

U.S. Cl. 128—90 **3 Claims**



1. A method of forming an orthopedic cast, comprising the steps of:

a. forming a flat sheet of a primary polymer in the form of poly (epsilon-caprolactone) having a melting point of between 50° C and 75° C and a half-time of crystallization at body temperature greater than 1 minute but less than 20 minutes, wherein the primary polymer is coated on a substrate, the substrate being a solid at the melting point of the primary polymer, the substrate being formed of an open weave netting of a secondary polymer, which secondary polymer is capable of being thermoformed by viscous flow at temperatures between 90° C and 170° C,

b. heating the sheet to the thermoforming temperature of the substrate a secondary polymer, molding the sheet to a preform contour suitable for conforming to a portion of the body and, immobilizing the pre-form by cooling,

c. subsequently heating the pre-form to a temperature above the softening point of the primary polymer but below the thermoforming temperature of the secondary polymer by immersing the pre-form in water at a suitable temperature,

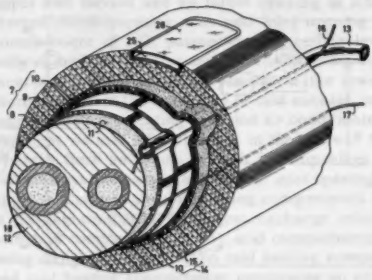
d. applying the pre-form to the portion of the body to be immobilized, and

e. allowing the sheet to cool to body temperature.

4,019,506
RIGID SUPPORTING BANDAGE AND METHOD FOR APPLYING SAME

Peter Eschmann, 82 Weinbergstrasse, 8006 Zurich, Switzerland

Filed Mar. 8, 1976, Ser. No. 665,052
Claims priority, application Switzerland, Mar. 14, 1975, 3168/75
Int. Cl.² A61F 5/04
U.S. Cl. 128—90 21 Claims



1. A rigid supporting bandage being applied in situ for fixing and repositioning a part of the live body which is at least partially covered with skin, which bandage comprises

a. a flexible base layer of textile material adapted to lie innermost on the body part to be fixed and repositioned, and being adapted to the shape of said body part,

b. an outer layer of hard self-cured synthetic polymer resin on the outside of said bandage, and

c. an intermediate layer on top of said base layer and underneath said layer of polymer resin, and consisting essentially of several plies of meshes of textile material filled with the same hard polymer resin which constitutes said outer layer;

at least the innermost ply of meshes of said base layer being free from said hard polymer resin,

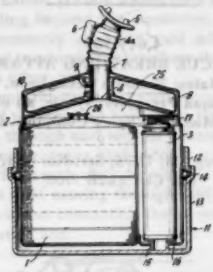
said base layer having at least one front end uncovered by said intermediate and outer layers, and containing channels which open at said at least one front end to the outside of said bandage, said channels being covered, on the side thereof toward said body part, by said innermost polymer resin-free ply of meshes of said base layer.

4,019,507
PROTECTIVE BREATHING DEVICE HAVING A FILTERING APPARATUS AND ADDITIONAL OXYGEN SUPPLY FOR EMERGENCY USE

Georg-Wilhelm Oetjen, and Ernst Warncke, both of Lubeck, Germany, assignors to Dragerwerk Aktiengesellschaft, Germany

Filed Sept. 24, 1975, Ser. No. 616,208
Claims priority, application Germany, Sept. 28, 1974, 2446410
Int. Cl.² A62B 7/08, 7/10; A61M 16/00
U.S. Cl. 128—142 R 5 Claims

1. A protective breathing device, comprising a housing having an upper portion with a breathing duct passage terminating in an outer end having a fitting for breathing by a user, said housing upper portion having an economy chamber therein communicating with said duct, exhaling valve means connected to said duct, said housing including a lower portion with an ambient air inlet opening, a filter positioned over the opening and having an inlet adjacent its lower end communicating with the opening for the passage of ambient air therethrough and also having a discharge adjacent its upper end communicating through said housing to said duct, check valve means in said filter outlet permitting flow only out of said filter outlet, a solid oxygen supply cartridge in said housing lower portion adjacent said filter and having a top end with a discharge communicating with said duct, and firing means con-

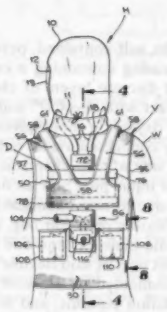


nected to said cartridge to effect the liberation of oxygen therefrom out through said cartridge discharge into said duct and into said economy chamber for release through said fitting.

4,019,508
WEARABLE, SELF-CONTAINED FULLY MOBILE PERSONAL BREATHING APPARATUS FOR SURGEONS AND OPERATING ROOM PERSONNEL

Estephan Der Estephanian, Altadena; Robert E. Foreman, Santa Ana; Robert D. Scott, West Covina, and Odd Friis, Huntington Beach, all of Calif., assignors to Research Development Systems, Inc., Pasadena, Calif.

Filed May 21, 1976, Ser. No. 688,734
Int. Cl.² A62B 7/02
U.S. Cl. 128—142.7 19 Claims



1. A wearable, self-contained and fully mobile personal breathing apparatus to be worn by a surgeon or like operating room wearer to control contamination of operating room space by the air normally expired by such wearer during surgery, the apparatus comprising:

vest means adapted to fit closely about the upper body of the wearer,

an expiried-air-decontaminating high efficiency, particulate air filter means for removing from said expired air entering the filter upstream side 99.9 percent of all particulate contaminants therein above 0.1 micron in size, said vest means including means for supporting said filter means, means for capturing wearer-expired air at its locus of expiration in locus unconfining relation and for directing said expired air to the upstream side of said filter means including conduit means communicating said locus with the upstream side of said filter means, and means arranged to return air thus decontaminated to said operating room space from the downstream side of said filter

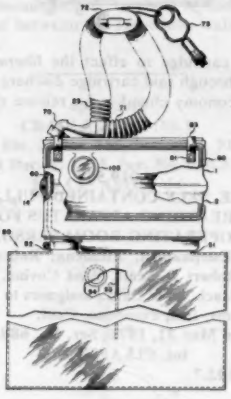
including a blower connected to the downstream side of said filter means inducing expired air flow in said conduit and through said filter in decontaminating relation.

4,019,509

SELF-RESCUE BREATHING APPARATUS

Yi-Sheng Li, San Mateo; Rudolph Cesar Leon, Sr., Cupertino, and Eugene Norman Perry, Sunnyvale, all of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Aug. 28, 1975, Ser. No. 608,723
Int. Cl.² A62B 7/08
U.S. Cl. 128—147 **11 Claims**



1. In a lightweight, self-contained, personal breathing apparatus including a casing containing a canister, a plurality of parallelly disposed discrete layers of chemical constituting a bed adapted to react with the CO^2 and moisture in exhaled breath to produce oxygen, a mouthpiece incuding an exhalation one-way valve connected via an exhalation conduit to an input port on one side of said chemical bed, a flexible reservoir bag having an input port and an output port, an output port on the other side of said chemical bed connected to the input port of the flexible reservoir bag, a chimney juxtaposed in said casing to said canister, one end of said chimney connected to the output port of said flexible bag, the opposite end of said chimney connected to the inlet valve in said mouthpiece via an inhalation conduit, and in which said layers of chemical are separated by pairs of spaced screens spaced from the bottom wall of said canister, the improvement in which

said canister is provided beneath said chemical bed with a trammel to prevent deliquesced chemical from entering into the bag,

said trammel comprising a tubular duct essentially parallel to and spaced from the bottom wall of said canister and supported therefrom by a tubular support which interconnects one end of said duct with the inside of said bag, the opposite end of said duct communicating with the interior of said canister being downwardly truncated to provide an upper surface overhanging the lower,

a pair of angular baffles, generally L-shaped in cross section, secured to said canister and extending generally parallel to said duct and substantially across approximately one half of the bottom of said canister, said opposite end of said duct positioned over said pair of angular baffles,

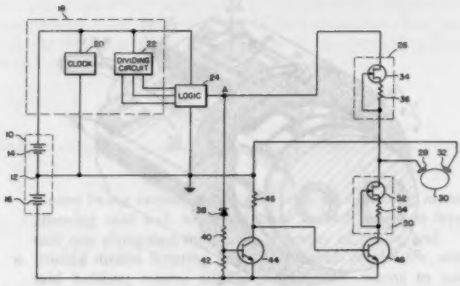
one generally horizontal leg of said angular baffle positioned between the lower surface of said duct and the bottom wall of said canister.

4,019,510

THERAPEUTIC METHOD OF USING LOW INTENSITY DIRECT CURRENT GENERATOR WITH POLARITY REVERSAL

Franklin Hammond Ellis, Rochester, N.Y., assignor to Sybron Corporation, Rochester, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,352
Int. Cl.² A61N 1/36
U.S. Cl. 128—172.1 **2 Claims**



1. A method of therapeutic healing skin lesions, ulcers, and the like, comprising the steps of:

maintaining electrodes at least one of which is silver bearing in proximity to said skin lesions, ulcers, and the like;

applying a first current flow of positive polarity having a first magnitude in the order of 4 microamps through said electrodes for a first period of time in the order of 50 minutes;

applying a second current flow of negative polarity and having a second magnitude in the order of 250 microamps for a second period of time in the order of 5 minutes through said electrodes, and

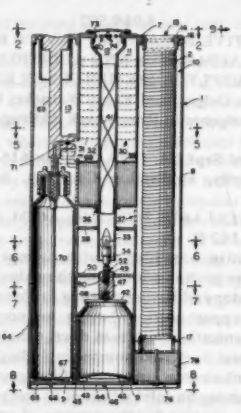
alternately repeating said applying steps for the duration of the therapy.

4,019,511

PORTABLE CONDITIONED AIR BREATHING DEVICE

Peter N. Choporis, 543 S. Beverly Lane, Arlington Heights, Ill. 60005, and Robert N. Choporis, 880 N. Lake Shore Drive, Chicago, Ill. 60611

Filed Sept. 11, 1975, Ser. No. 612,278
Int. Cl.² A62B 7/12
U.S. Cl. 128—212 **16 Claims**



1. A portable conditioned heated air breathing device comprising a compartmented canister having a top, sides and bottom and containing a plurality of side by side compart-

ments running from the top toward the bottom thereof, said compartments comprising:

a. a conditioned air and breathing tube means compartment containing breathing tube means and having exit means for said breathing tube means at the upper end of said compartment and an inlet opening in a sidewall for transmitting conditioned air to said compartment, whereby conditioned air can be transmitted from said compartment through said tube breathing means to the user,

b. an air conditioning compartment adjacent said compartof (a) having one or more openings in a sidewall and at the upper end thereof and an outlet opening in a sidewall thereof communicating with said inlet opening in said compartment of (a), passageways extending longitudinally of and adjacent to said air conditioning compartment and having air inlet openings at the lower ends thereof adjacent the lower end of said canister, said passageways communicating with said air conditioning compartment via said inlet openings in the sidewall thereof, whereby fresh air enters said air inlet openings in said passageways and passes through said inlet openings at the upper end of said air conditioning compartment.

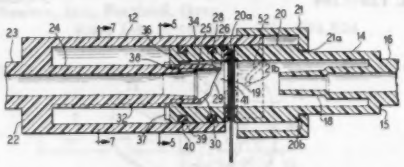
c. a heating compartment in heat exchange relationship with said compartment of (b), said compartment of (b) being airtight with respect to said heating compartment and said heating compartment comprising an elongated metal tube and heating means for said tube whereby the walls of said tube are heated, said heated walls being within and spaced from the inner walls of the compartment of (b) whereby fresh air introduced into said inlet openings of said compartment of (b) passes along said heated walls and is heated by heat exchange therewith prior to passing through said outlet opening to said compartment of (a) and therefter through said tube breathing means.

4,019,512

ADHESIVELY ACTIVATED STERILE CONNECTOR

Francis J. Tenczar, P.O. Box 42919, Evergreen Park, Ill. 60642

Filed Dec. 4, 1975, Ser. No. 637,750
Int. Cl.² A61M 5/14; F16L 37/24
U.S. Cl. 128—214 R **16 Claims**



1. A connector assembly for transferring fluids from one source to another under contaminant precluding conditions, including

a first connector having one end for conduit connection to a fluid source and an opposite open end, a first tubular coupling element positioned within said first connector, said first tubular coupling element being communicable with said conduit connection, a penetrating end associated with said first tubular coupling element,

a second connector having one end for conduit connection to a fluid source and an opposite open end, a second tubular coupling element positioned within said second connector, said second tubular coupling element being communicable with said conduit connection, said second tubular coupling element having an end engageable with said first tubular coupling element,

a penetratable barrier assembly closing the open end of each of the connectors, each barrier assembly including a penetratable barrier and a removable protective member, an adhesive film covering a substantial portion of the area between the barrier and the protective member in at least one of said barrier assemblies, said protective member having a barrier portion covering the penetratable barrier, and a handle portion folded over the barrier portion and extending beyond the connector, said handle portions progressively exposing said adhesive film upon being pulled to progressively adhere the protective barriers to each other, and

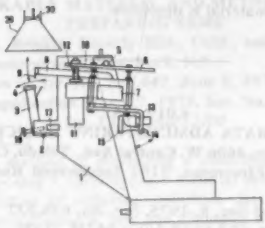
means to permit relative movement between the penetrating end and the adjoined barriers so that said penetrating end moves through said area of adhesion, said first coupling element engages said second coupling element to establish a fluid path after the adhered barriers are penetrated, said fluid moving through said engaged coupling elements without contacting the penetrated barriers on the penetrating end.

4,019,513

AUTOMATED APPARATUS FOR SHAPING THE BEAK OR BILL OF YOUNG FOWL

Janeck Kaniecki, Pacy-sur-Eure, France, assignor to Jean Lissot, Pacy-sur-Eure, France

Filed Aug. 4, 1975, Ser. No. 601,423
Claims priority, application France, Aug. 7, 1974, 74.27481
Int. Cl.² A61B 17/00; A61D 1/00
U.S. Cl. 128—223 **10 Claims**



1. An apparatus for shaping beaks of fowl, said apparatus comprising a blade, first support means mounting said blade for reciprocation along a path, a platen member for reception in the mouth of a fowl with the upper part of the beak of a fowl supported thereon, second support means mounting said platen member for movement between a retracted beak receiving position and a forward operative position aligned with the path of said blade means for varying the forward operative position of said platen member within the path of said blade to vary the length of a cut upper beak, drive means connected to said first support means for effecting reciprocation of said blade, and control means for said drive means, said control means including means responsive to movement of said second support means to said forward operative position whereby said blade reciprocates toward said platen member to trim an upper part of a beak to a predetermined length.

4,019,514

SURGICAL SYSTEM FOR CONTROLLING THE INFUSION OF FLUID TO AND THE EVACUATION OF FLUID AND MATERIAL FROM AN OPERATING FIELD

Anton Banko, Bronx, N.Y., assignor to Surgical Design Corporation, Long Island City, N.Y.

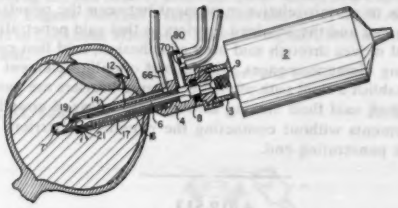
Continuation-in-part of Ser. No. 475,398, June 3, 1974, Pat. No. 3,920,014. This application Nov. 17, 1975, Ser. No. 632,768
Int. Cl.² A61M 1/00
U.S. Cl. 128—230 **10 Claims**

1. In combination, a system for use with a surgical instrument of the type having an operative portion at an operating site with the operative portion including selectively operable

means for separating material from the object being operated on, a first means for delivering an infusion fluid to the operating site and a second means for removing separated material from the operating site,

a source of infusion fluid,

means including a single valve means for supplying infusion fluid from said source at variable pressure to said first means of said instrument,



means producing a pressure differential condition at said second means of the instrument with respect to the pressure of the infusion fluid at said first means to provide removal of material from the operating site,

and means for selectively operating said single valve of said infusion fluid supply means in first and second conditions wherein in the first condition when said means for separating material is inoperative to produce a lower pressure than when in said second condition when the means for separating material is operative.

4,019,515

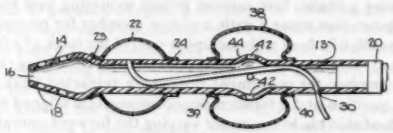
ENEMATA ADMINISTERING DEVICE

Daniel Kornblum, 4606 W. Central Ave., Toledo, Ohio 43615, and John S. Efroymson, 5154 Saddlecreed Road, Toledo, Ohio 43623

Filed Dec. 8, 1975, Ser. No. 638,337

Int. Cl.² A61B *6/00*; A61M *25/00*

U.S. Cl. 128—246 **11 Claims**



1. In an enemata administering device having a hollow stem with an exit port at a first end thereof and an inlet at the second end thereof, the improvement comprising:

a first inflatable and deflatable annular retention balloon sealed across a portion of the stem near the forward end thereof,

an airway extending to a first post in the stem under said first balloon to provide inflation and deflation of said first balloon, and

a second inflatable and deflatable annular balloon sealed across a portion of the stem rearward from said first balloon,

said stem having a second port providing communication between the interior of said stem and the interior of said second balloon,

said second balloon inflating solely when liquid is flowed through said stem, and said first balloon inflating solely when fluid is forced through said airway,

when said balloons are so inflated, said second balloon automatically conforming to a patient's external anatomy and causing the inflated first balloon to be held in a sealing position within the patient.

4,019,516

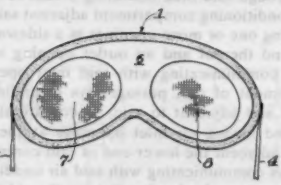
EYE SHIELD DEVICE

Rosemarie D'Auria, Jersey City, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 10, 1975, Ser. No. 630,677

Int. Cl.² A61F *7/02*

U.S. Cl. 128—268 **1 Claim**



1. An eye shield device, comprising

an eye covering member comprising a unitary strip of opaque material having an inner surface adjacent the eyes of a wearer when in use;

layers of padding material affixed to the inner surface of the opaque material;

fastening means on the eye covering member for removably affixing said member over the eyes of a wearer;

a pair of spaced recesses formed in the layers of padding material and bounded by the adjacent inner surface of said unitary strip of the eye covering member over the eyes of a wearer; and

a pair of medicated eye pads removably accommodated in said recesses for applying medication to the eyes of a wearer.

4,019,517

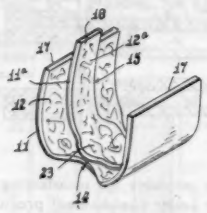
DISPOSABLE DIAPER

Jacob A. Glassman, 1680 Meridian Ave., Miami Beach, Fla. 33139

Filed July 2, 1975, Ser. No. 592,406

Int. Cl.² A61F *13/16*

U.S. Cl. 128—284 **5 Claims**

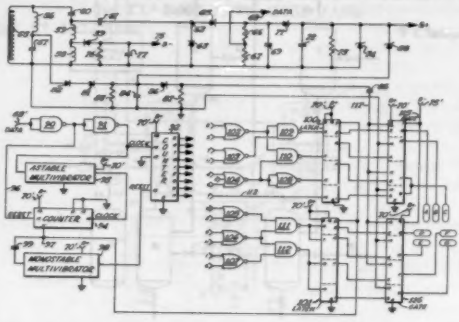


1. A double-duty diaper comprising, in combination, a main diaper including at least one relatively thick, substantially rectangular layer of highly moisture-absorbent material having a longitudinal central portion, an insert strip of less width than the main diaper also of highly moisture absorbent material superimposed on said longitudinal central portion of and being lightly adhered to the inner surface of said one layer, means carried by the main diaper for securing same about the waist portion of a human body with said insert strip in position to contact the body, and means for removing said insert strip from the main diaper without corresponding removal of or impairment of the diapering potential of said main diaper comprising said insert strip having length greater than that of the longitudinal central portion of the main diaper whereby at least one end of the insert strip extends as a pull tab beyond a related end edge of the main diaper.

4,019,518
ELECTRICAL STIMULATION SYSTEM

Donald D. Maurer, Anoka, and Paul D. Sorenson, Blaine, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Aug. 11, 1975, Ser. No. 603,434
Int. Cl.² A61N 1/34
U.S. Cl. 128—419 R 34 Claims

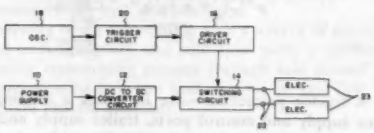


1. In an electrical stimulation system for selectively stimulating portions of the body of the type having external means for transmitting stimulus signals and control signals, implantable means for receiving said transmitted signals, a plurality of output means adapted to apply said stimulus signals to the body and means interconnecting said receiving means and said output means and responsive to said control signals for routing said stimulus signals to said output means, the improvement wherein: said output means are adapted for combination in a plurality of preselected configurations: said transmitting means includes means for alterably preselecting a predetermined characteristic of each control signal, said predetermined characteristic manifesting a desired one of said output means configurations; and said routing means comprises means for selectively routing said stimulus signals to the desired output means configuration in accordance with the predetermined characteristic of said control signals.

4,019,519
NERVE STIMULATING DEVICE

Leonardus Johannes Geerling, Hillsboro, Oreg., assignor to Neuvex, Inc., Portland, Oreg.

Filed July 8, 1975, Ser. No. 594,024
Int. Cl.² A61N 1/36
U.S. Cl. 128—422 12 Claims



9. A nerve stimulating device for stimulating nerves of a body comprising:

oscillator means for producing variable rate timing pulses;

trigger circuit means for receiving said timing pulses and for generating trigger signals of predetermined pulse width;

driver circuit means for receiving said trigger signals and for generating driving signals in response thereto;

voltage conversion means for providing adjustable regulated voltages; and

switching means for receiving said driving signals and said adjustable regulated voltages and producting output timed pulses of amplitude equal to said regulated voltages and of constant width; and

electrode means connected to said switching means and adapted to be secured to a selected area of a body so that said timed pulses stimulate the nerves at said selected area.

4,019,520
TOBACCO SUBSTITUTE CONTAINING BORIC OXIDE, BORON OXYACIDS, AND AMMONIUM, ALKALI METAL, OR ALKALINE EARTH METAL SALTS OF BORON OXYACIDS

David G. Strubel, Jeffersontown, and Robert R. Johnson, Louisville, both of Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Nov. 25, 1974, Ser. No. 527,175
Int. Cl.² A24D 1/18
U.S. Cl. 131—2 33 Claims

21. A tobacco substitute comprising:

a. from about 2 to about 25% by weight of a boron compound selected from the group consisting of boric oxide, a boron oxyacid, and ammonium, alkali metal, and alkaline earth metal salts of a boron oxyacid;

b. from about 40 to about 93% by weight of an inorganic filler selected from the group consisting of alumina, alumina trihydrate, magnesium carbonate, calcium carbonate, and charcoal;

c. up to about 15% by weight of a material selected from the group consisting of monoammonium phosphate or diammonium phosphate; and

d. from about 5 to about 35% by weight of an organic binder

e. wherein during combustion said boron compound melts or fuses to form a stable ash.

4,019,521
SMOKABLE MATERIAL AND METHOD FOR PREPARING SAME

Theodore S. Briskin, Beverly Hills, Calif., assignor to Philip Morris Incorporated, New York, N.Y.

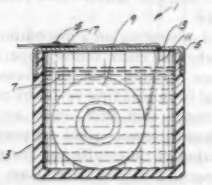
Continuation of Ser. No. 367,447, June 6, 1973, abandoned. This application Mar. 27, 1975, Ser. No. 562,735
Int. Cl.² A24B 15/00
U.S. Cl. 131—2 5 Claims

1. In the method of producing a smokable material, the steps of exposing a carbohydrate material selected from the group consisting of cellulose, cellulosic derivatives, starch, pectin, polyvinyl alcohol, gum and aliginates to a temperature of from about 350° to about 750° C for a time sufficient to effect a weight loss of at least about 50% but not more than 90%, said time being not more than about 10 minutes, maintaining the material in a non-oxidizing gas during the heat treatment, and then processing the thermally reacted product to a form desired for the smoking material.

4,019,522
DENTAL HYGIENE PACKAGE

Charles H. Elbreder, 1702 Chase Drive, Fenton, Mo. 63026

Continuation-in-part of Ser. No. 541,636, Jan. 16, 1975, abandoned. This application May 5, 1976, Ser. No. 683,268
Int. Cl.² A61C 15/00
U.S. Cl. 132—90 12 Claims



1. A dental hygiene package comprising:

a container;

a body of viscous material including a dental medicament in said container, said material hving a viscosity in the order of between 2,500 and 78,000 centipoises;

a supply of dental floss immersed in said body of material

thereby to impregnate the floss and adhere to the strands thereof;

an orifice in said container through which the medicament-carrying dental floss may be withdrawn from said container, said orifice being of a size substantially larger than the cross-section of the floss and having a size and shape relative to that of the floss whereby a predetermined and controlled amount of medicament is supplied per length of medicament-carrying floss drawn through the orifice from said container; and

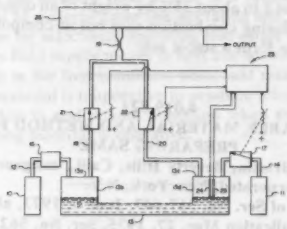
means secured to said container for severing the medicament-carrying floss into desired lengths.

4,019,523

METHOD AND APPARATUS FOR MIXING GASES

Justin S. Clark, 720 E. 3120 South, Salt Lake City, Utah 84106, and Wm. Dean Wallace, 408 Second Ave., Salt Lake City, Utah 84103

Filed Feb. 7, 1975, Ser. No. 547,856
Int. Cl.² G05D *11/13*
U.S. Cl. 137—7 **4 Claims**



1. A method of mixing gases, which comprise the steps of

a. balancing the pressures of gases to be mixed against one another until the gases are all at the same pressure;

b. sequentially flowing the gases through a common restrictor while maintaining the pressures in a balanced condition; and

c. regulating the flow of each gas through the restrictor to a mixing chamber according to a time that is proportionate to the desired concentration of the gas in the mixing chamber and flow ratios of the gases.

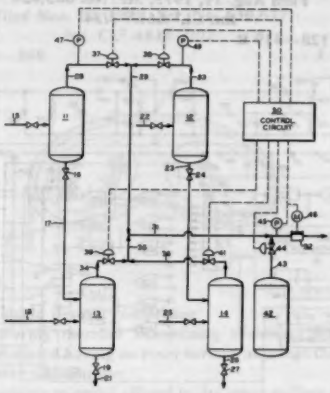
4,019,524

USE OF EQUALIZATION CHAMBER IN DISCONTINUOUS VENTING OF VESSEL

Bobbie L. Whitson, and John A. Morgan, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 391,662, Aug. 27, 1973, abandoned, which is a division of Ser. No. 225,171, Feb. 10, 1972, Pat. No. 3,780,761. This application June 17, 1976, Ser. No. 697,005
Int. Cl.² G05D *7/06, 16/20*
U.S. Cl. 137—14 **15 Claims**

13. A method of venting on a discontinuous basis gas from a first vessel wherein each venting operation for said first vessel comprises: venting said first vessel by withdrawing gaseous material from said first vessel by providing fluid communication between said first vessel and a second vessel, having a significantly lower initial gas pressure than said first vessel, for a period of time sufficient for the gas pressures in said first and second vessels to at least substantially reach equilibrium condition, thereby transferring an equilibrium quantity of gaseous material from said first vessel to said second vessel; discontinuing said fluid communication at the end of said period of time to isolate said first vessel from said second vessel; and thereafter withdrawing from said second vessel the equilibrium quantity of gaseous material, transferred thereto from said first vessel, until the gas pressure in said second vessel reaches said lower initial gas pressure by providing fluid communication between said second vessel and the inlet of a gas compressing means, while said first vessel is isolated from the inlet of said gas compressing means, until



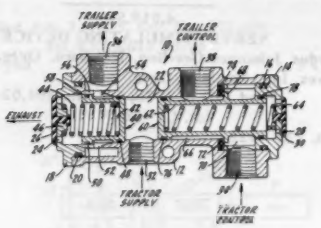
the gas pressure in said second vessel reaches said lower initial gas pressure, thereby completing the venting operation of said first vessel and making said second vessel and said gas compressing means available for the next venting operation.

4,019,525

TRACTOR PROTECTION VALVE

Charles Horowitz, Niles, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.

Filed Jan. 22, 1976, Ser. No. 651,410
Int. Cl.² G05D *7/00*
U.S. Cl. 137—107 **11 Claims**

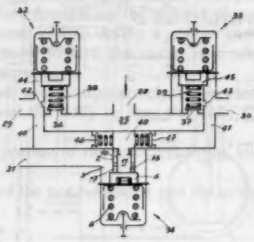


1. A tractor protection valve including a housing having tractor supply and control ports, trailer supply and control ports and an exhaust port, a chamber in said housing with all of said ports opening into said chamber, a first piston movable in said chamber between said tractor supply and trailer supply ports, spring means urging said first piston to a position closing communication between said tractor supply and trailer supply ports and opening communication between said trailer supply and exhaust ports, a second piston movable in said chamber on the same axis as said first piston and between said tractor control and trailer control ports, spring means urging said second piston to a position closing communication between said tractor control and trailer control ports, said tractor supply port being positioned intermediate said first and second pistons with air pressure at said tractor supply port causing said first and second pistons to move in opposite directions in said chamber to open communication between said tractor control and trailer control ports and between said tractor supply and trailer supply ports.

4,019,526
DEVICE FOR SHUTTING OFF DAMAGED SECTIONS IN PNEUMATIC MULTI-SECTION BRAKING SYSTEMS FOR VEHICLES

Bruno Zoppi, Milan, Italy, assignor to Fabbrica Italiana Magneti Marelli, S.p.A., Milan, Italy

Filed Nov. 5, 1975, Ser. No. 629,072
Claims priority, application Italy, Nov. 15, 1974, 29469/74
Int. Cl.² B60T *15/46*; G05D *11/00*
U.S. Cl. 137—110 **9 Claims**



1. A shutting off valve for a pneumatic braking system, particularly for shutting off damaged sections of the system, said valve comprising:

A first body; said first body having a first base; a first valve seat being defined on said first base; an opening in said first body extending inwardly from said first base;

a second body located in said opening in said first body; said second body being movable through said opening with respect to said first body; said second body having a respective second base that faces the same direction as said first base; a second valve seat being defined on said second base; said second body being movable through said opening and toward a shutter up to a first maximum distance; a flow path defined through said second body providing communication between said opening and said second valve seat;

a shutter located in opposed relation to both of said first and said second valve seats; means biasing said shutter toward engagement with said valve seats; said shutter being movable away from said bases through a distance greater than said first maximum distance;

said first and said second valve seats being spaced apart; said first and said second valve seats being shaped to define an enclosed plenum chamber between said valve seats; said plenum chamber being further defined by and communicating with said shutter;

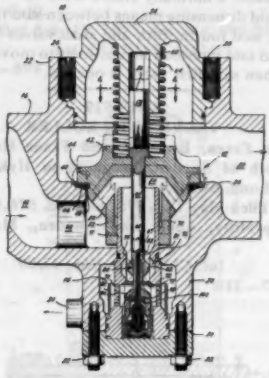
said opening being connectible with a source of pneumatic fluid under pressure and said flow path; a calibrating, pressure transmitting passage through said second body communicating between said opening in said first body and said plenum chamber.

4,019,527
MODULATING FLOW CONTROL VALVE

Warren H. Brand, Blue Bell, Pa., assignor to Yarway Corporation, Blue Bell, Pa.

Filed Mar. 3, 1975, Ser. No. 554,401
Int. Cl.² G05D *11/00*
U.S. Cl. 137—115 **19 Claims**

1. A modulating flow control valve assembly including main check valve means movable between a fully closed and a fully open position in response to flow of fluid from a pressure source to a demand system and including an intermediate position wherein the fluid flow to said demand system corresponds to a preselected minimum flow from said pressure source, and bypass valve means for controlling the flow of fluid from said pressure source to a recirculation system, said bypass valve means having a fully open position when said main check valve means is in its fully closed position and being movable to a fully closed position when said main check valve means is in its intermediate position, piston means operatively associated with said bypass valve means, said piston means being in fluid communication with the inlet side of said main

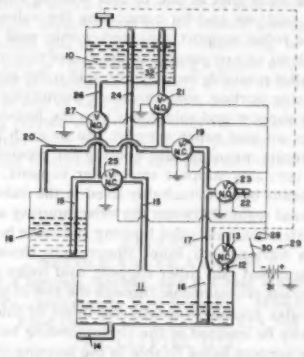


check valve means whereby pressure at inlet side of said main check valve means is operative in moving said bypass valve means between said fully open and fully closed positons, pilot valve means for controlling the pressure acting on said piston means.

4,019,528
FLUID MIXING APPARATUS

James Robert Tyrrell, Bloomington, Minn., assignor to Anton Braun, Minneapolis, Minn.

Filed July 23, 1975, Ser. No. 598,204
Int. Cl.² B67D *5/04*
U.S. Cl. 137—209 **3 Claims**



1. Fluid mixing apparatus comprising a tank for a first fluid, a container for receiving a second fluid, dispensing means having a first portion extending from a point at or near the bottom of said container to said tank and a second portion extending from a point at or near the bottom of said tank to the top portion of said container, an opening for filling said tank, a normally closed first valve in said opening, a normally closed second valve in the first portion of said dispensing means, interlock means between said first and second valves to cause them to open and close substantially simultaneously, first and second vent means leading from said second portion

of said dispensing means at points between said tank and said container, a normally open third valve in the first of said vent means that is operably connected to said interlock means so as to close when said first valve opens, a storage tank for said second fluid with a refill conduit extending between it and said container, a normally open fourth valve located in said refill conduit, a normally open fifth valve located in the second of said vent means, a normally closed sixth valve in said second portion of said dispensing means between said first and second vent means, said fourth, fifth and sixth valves being operably connected to said interlock means so as to move to their other positions when said first valve is opened.

4,019,529
VALVE WITH ROLLER

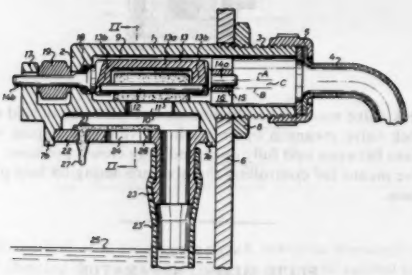
Per Torsten Faxen, Bromma, and Frans Harry Karlsson, Lund, both of Sweden, assignors to Hykon-Patent Aktiebolag, Lund, Sweden

Filed May 12, 1975, Ser. No. 576,520

Claims priority, application Sweden, May 13, 1974, 7406344

Int. Cl.² F16K *1/16, 45/00*

U.S. Cl. 137—218 **4 Claims**



1. A rotary valve comprising an elongated valve housing having opposed ends and at least a portion of said central cavity having a substantially cylindrical inner peripheral surface and an outlet opening extending through said peripheral surface, an axial inlet at one of said housing ends, extension means on said one end for connecting the valve to a supply conduit, a roller support mounted within said housing for rotation about an axis parallel to the axis of said inlet opening, a single roller rotatably mounted on said roller support in said valve housing portion, said extension permitting insertion of said roller support and said roller into the housing, a pair of stub shafts on said roller support one at each end thereof, spaced bearing means in said housing for receiving said stub shafts to rotatably support said roller support, one of said bearing means being detachably fixed in the valve housing in a transitional region between the valve housing and the valve housing extension, said valve housing and valve housing extension each having such inner dimensions throughout their entire length that said roller support, said roller and said one bearing means are insertable through the end of said extension into the valve housing whereby the other of said stub shafts may thereby be inserted in the corresponding bearing means, said roller support being fixable in the housing by said insertable, fixable bearing means by insertion of the latter in the housing in a position on the corresponding roller support stub shaft and fixing this bearing means in the valve housing, operating means for moving said support and said roller for closing and opening said valve, said roller being supported in position to roll on said cylindrical surface to and from open and closed positions in relation to said outlet opening whereby in the closed position the outlet is fully covered by a portion of the circumference of the roller and in the open position the roller is spaced from said outlet, said roller being mounted by said roller support for rotation about an axis parallel to and spaced from the axis of rotation of said roller support.

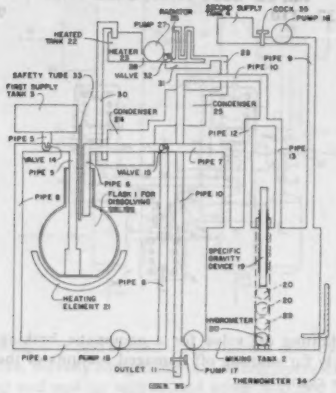
4,019,530
CHEMICAL DILUTING SYSTEM

Issabhai I. Chandroga, Oshawa, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Feb. 17, 1976, Ser. No. 658,373

Int. Cl.² B01F *1/00*

U.S. Cl. 137—334 **4 Claims**



1. A chemical diluting system, comprising
a heated flask for dissolving solids;
a mixing tank;
a first supply tank;
a second supply tank;
pipe means connecting the first tank to the flask, connecting the flask to the mixing tank, connecting the first supply tank to the flask and to the mixing tank, connecting the second supply tank to the mixing tank and connecting the mixing tank to an outlet;
valve means in the pipe means for selectively controlling the connection of the first supply tank to the flask and to the mixing tank and of the mixing tank to the flask and to the first supply tank; and
pump means in the pipe means for pumping liquids through the pipe means.

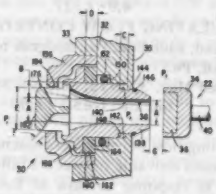
4,019,531
INLET ORIFICE DEVICE TO CONTROL THRUPUT FLOW FOR PRESSURE REGULATORS

Dwight N. Johnson, Anaheim, Calif., assignor to The Singer Company, New York, N.Y.

Continuation of Ser. No. 535,072, Dec. 20, 1974, abandoned, which is a division of Ser. No. 426,294, Dec. 19, 1973, Pat. No. 3,892,255. This application Apr. 7, 1976, Ser. No. 674,334

Int. Cl.² F16K *31/12*

U.S. Cl. 137—504 **3 Claims**



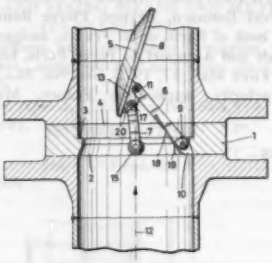
1. An inlet orifice device for controlling the pressure of the flow gas therethrough comprising:
a. a housing havng a transverse partition therein to divide the housing into an inlet side and an outlet side,

b. a valve body slidably mounted in the partition to move toward or away from the outlet side,
c. an orifice formed in the body having an inlet portion and an outlet portion to communicate the inlet side with the outlet side,
d. a poppet element fixedly carried by the body on the inlet side thereof,
e. a nozzle member connected on the inlet side of the housing to coact with the poppet element to form a continuously open and variable inlet flow area between the inlet side and the orifice, whereby the smaller the inlet flow area, the greater the reduction of inlet pressure,
f. an inlet face formed on the poppet element exposed to inlet pressure and to define a poppet piston to urge the body to move toward the outlet side responsive to the inlet pressure,
g. a resilient means operatively connected between the housing and the body to urge the body toward the inlet side,
h. the inlet portion of the orifice defining an orifice piston, and
i. the areas of the poppet piston and the orifice piston being equal.

4,019,532
FLAP VALVE

Friedrich Schittek, Bremen, Germany, assignor to Gustav F. Gerdts KG, Bremen, Germany

Filed May 28, 1975, Ser. No. 581,462
Claims priority, application Germany, June 7, 1975, 2427577
Int. Cl.² F16K *15/02*
U.S. Cl. 137—527 **7 Claims**

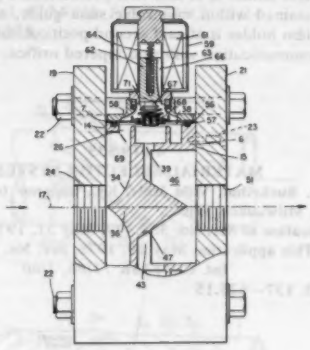


1. A flap valve and in particular a return flap valve comprising:
a flat disk-like valve housing having inlet and outlet openings along its longitudinal axis defining a flowthrough channel;
a valve seat formed in said housing and surrounding said outlet opening;
a valve disk disposed on said valve seat for closing and sealing the output opening, said disk having pivot axis means projecting toward the input opening and offset from the valve axis;
a first control lever having its ends pivotably coupled to diametrically opposite portions of said housing in the inlet opening and its center portion pivotably coupled to said pivot axis means; and
a second control lever having one end pivotably coupled to said pivot axis means, and its opposite end pivotably coupled to said housing in close proximity with respect to a wall of said flowthrough channel at the inlet opening, the pivot axes of both control levers being arranged parallel to each other so that when said valve disk is closed on said valve seat, both control levers be in the same plane which is perpendicular to the valve axis, and when said valve disk is opened, said first control lever displaced said disk apart from said valve seat and said second control lever maintains the disk in a non-perpendicular position with respect to valve axis.

4,019,533
DIGITAL VALVE ASSEMBLY

James B. Jerde, Mountain View, and Victor B. van Blerk, San Jose, both of Calif., assignors to Digital Dynamics, Inc., Sunnyvale, Calif.

Filed July 17, 1975, Ser. No. 596,581
Int. Cl.² F16K *11/24*
U.S. Cl. 137—599 **3 Claims**

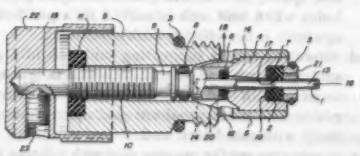


1. A digital valve assembly comprising a polygonal body exteriorly bounded by a plurality of joining planar sides and also bounded by a pair of parallel planar end faces, means forming an inlet passage opening on one of said end faces of said body and in communication with means forming a plurality of discrete inlet branch passages each having a discrete and separate inlet valve opening entirely on a respective one of sid planar sides, means forming an outlet passage opening on the other of said end faces of said body and in communication with means forming a plurality of discrete outlet branch passages each having a discrete and separate outlet valve opening entirely on a respective one of said planar sides adjacent to and concentric with a respective one of said inlet valve openings, the flow areas of said outlet branch passages having a predetermined and different size relationship to each other, and a plurality of valves each having a planar end substantially abutting and mounted on said body at and entirely outside of a respective one of said planar sides and overlying and interconnecting related ones of said inlet valve openings and concentric outlet valve openings and in position to control flow between said related ones of said inlet and outlet valve openings.

4,019,534
NEEDLE VALVE ASSEMBLY

Thomas W. Clements, Ambler, and E. Craig Waters, Lansdale, both of Pa., assignors to Will Ross, Inc., Milwaukee, Wis.

Filed Oct. 6, 1975, Ser. No. 619,748
Int. Cl.² F16K *1/52*
U.S. Cl. 137—614.18 **11 Claims**



1. A valve body assembly comprising a housing, a valve

stem holder axially movable within said housing between a first position and a second position, a hollow, tubular valve stem secured to said valve stem holder and extending outwardly from said housing, a valve stem guide retained between said housing and said valve stem, and an annular orifice plug retained between said valve stem and said housing and between said valve stem guide and said valve stem holder, said orifice plug having an inner taper forming a tapered orifice between said valve stem and said plug, said valve stem having a cross-flow channel through the wall thereof and a continuous circumferential groove on the outer surface thereof in fluid communication with said channel, whereby when said valve stem holder is at said first position, said groove is sealingly retained within said valve stem guide, and when said valve stem holder is at said second position, said groove is in fluid communication with said tapered orifice.

4,019,535

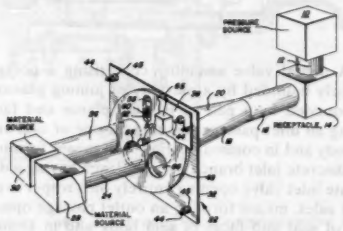
MATERIAL SELECTOR SYSTEM

Paul J. Buckethal, Villa Hills, Ky., assignor to Globe-Union Inc., Milwaukee, Wis.

Continuation of Ser. No. 365,599, May 31, 1973, abandoned. This application May 19, 1975, Ser. No. 578,571

Int. Cl.² F16K *11/06, 3/00*

U.S. Cl. 137—625.15 **16 Claims**



1. Selector apparatus for comminuted material entrained in a gaseous fluid comprising:

a. first and second pieces of substantially rigid material, each defining a surface, each of said pieces of material having at least one hole in said surface;

b. means supporting said pieces of material with their surfaces in fixed relationship to define a uniform space therebetween and with the holes in substantial alignment;

c. a web of deformable material disposed between said first and second pieces, said web having a transverse dimension significantly less than the transverse dimension of said space, whereby said web is freely movable in said space and said fluid may pass freely between said web and said plate surfaces, said web being transversely deformable under pressure to engage one of said surfaces to form a substantial fluid tight seal without substantial loss of shape of integrity and having an aperture therethrough such that when said aperture is aligned with said holes a passageway is provided between said holes, said transverse dimension being sufficient to permit movement of said web between said surfaces while substantially filling said space, the web being sufficiently large to overlie said holes when said web is moved to a position where said aperture is not aligned with said holes;

d. mounting means supporting said web in a position with said aperture in alignment with said holes and permitting movement of said web means in said space relative to said plates to a position where said aperture is out of alignment with said holes; and

e. moving means for moving said web relative to said pieces to alternatively bring said aperture into and out of alignment with said holes.

4,019,536

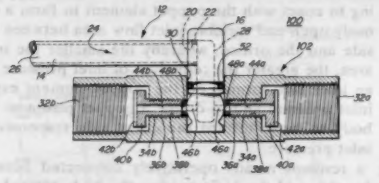
SWING SPOUT FAUCET

Poy Dong, 70 Louise St., Newton, Mass. 02158, and James P. Fahey, 34 Powder House Blvd., Somerville, Mass. 02143

Filed Oct. 1, 1975, Ser. No. 618,391

Int. Cl.² F16K *11/087*

U.S. Cl. 137—625.41 **9 Claims**



1. A faucet comprising: a spout having a main duct; a housing; a recess in said housing for rotatably receiving the inner end of said spout; said spout being rotatable between at least two positions, a first position and a second position; a first transverse duct in said spout proximate said inner end of said spout and communicating with said main duct of said spout; a first bore in said housing for connection with a first fluid source and extending to said recess and said inner end of said spout; a first adjustable sealing member in said bore; and a first passage extending through said adjustable sealing member to said recess for communicating with said first transverse duct in said first position and not in said second position.

4,019,537

ARRANGEMENT FOR MOUNTING GUIDE VANES OR OTHER TRANSVERSE OBJECTS INSIDE A CONDUIT

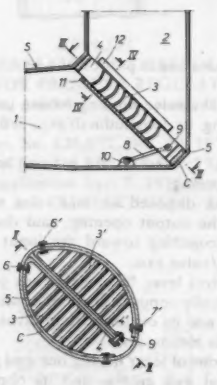
Pierre Marcel Bonnard, Beynes; Pierre Bonnet, and Louis Duthion, both of Paris, all of France, assignors to Bertin & Cie, Plaisir and Aeroport de Paris, Paris, both of, France

Filed Mar. 27, 1975, Ser. No. 562,663

Claims priority, application France, Mar. 28, 1974, 74.10802

Int. Cl.² F15D *1/04*

U.S. Cl. 138—37 **4 Claims**



1. A fluid conveying duct bounded by a wall having two opposite portions facing one another, comprising:

two closely adjacent though mutually spaced plates generally parallel to and on both sides of a plane extending longitudinally with respect to the fluid flow direction in said duct and bounding therebetween a laminar gap ex-

tending in said plane, said plates projecting from a first location of said wall intermediate said facing portions thereof, generally crosswise of said duct, to end short of a second location of said wall intermediate said facing portions thereof and opposite to said first location, whereby each of said plates has a proximal end adjacent said first location and a distal end spaced from said second location,

a gusset fast with said wall at a third location adjacent said second location,

a tie-link hingedly connecting the distal end of said plates to said gusset, and

a first and a second stationary set of transverse fluid guiding members each having an outer end respectively fixed to one or the other of said opposite wall portions and an inner end respectively fast with that one of said two plates which is on the same side of said plane as the respective member.

4,019,538

CENTERING AND FIXING MEANS AND METHOD FOR ITS FABRICATION

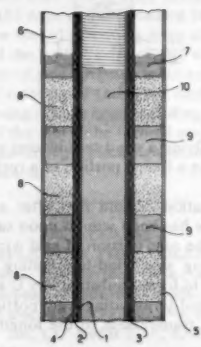
Pierre Desse, Orleans, and Jean-Pierre Trezeguet, Venissieux, both of France, assignors to Les Cables de Lyon, Lyon Cedex, France

Filed Apr. 3, 1975, Ser. No. 564,974

Claims priority, application France, Apr. 25, 1974, 74.14462

Int. Cl.² F16L 9/14

U.S. Cl. 138—108 **3 Claims**



1. In combination, a tubular body having an axially extending internal wall, a long thin object axially disposed inside said tubular body, a filling material made of a granular substance extending between the long thin object and the internal wall of said tubular body, said filling material comprising an axial succession of agglomarated layers separated by non-agglomarated layers of granular substance, said agglomarated layers comprising filling material being agglomaratedly hardened in situ by a resinous compound hardened when cold, in a short time by contact with a gas borne catalyst such that the assembly formed thereby is free of thermal stress.

4,019,539

HOLLOW FLEXIBLE TUBULAR BODY, PROCESS AND APPARATUS FOR MAKING THE SAME

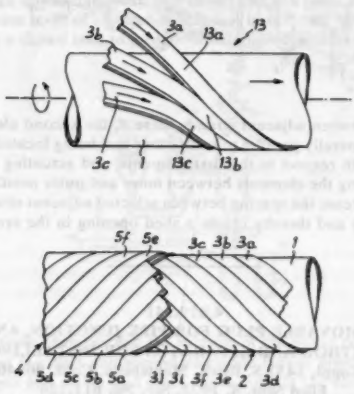
Daniel Hoffmann, Bourg-en-Bresse, and Remi Reynard, Bordeaux, both of France, assignors to Societe des Hauts Fourneaux de la Chiers, Longwy-Bas; Coflexip and Institut Francais due Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, both of Rueil-Malmaison, all of, France

Continuation of Ser. No. 355,081, April 27, 1973, abandoned. This application June 9, 1975, Ser. No. 584,933

Claims priority, application France, Apr. 28, 1972, 72.15295

Int. Cl.² F16L 11/00, 11/12, 11/14

U.S. Cl. 138—118 **5 Claims**



1. A flexible tubular body comprising a plurality of superposed tubular layers, each formed from a plurality of elongated strips of resilient metal having two substantially parallel edges and helically wound about a hollow flexible tube to form a layer, each strip having its parallel edges hooked in opposite directions, with the edges of adjacent helically wound strips overlapping and so engaged as to permit limited relative sliding axially of said body, and each strip having been prestressed by twisting it helically until permanently deformed before being wound about said flexible tube, the strips in the innermost of each two adjacent layers being deformed to form helics having an inner diameter approximating the outer diameter of the said flexible tube, and the strips of the outermost layer being deformed to form helics having an inner diameter smaller than the outer diameter of said innermost layer, so as to exert compressive force on said innermost layer.

4,019,540

LOOM FOR PRODUCING THREE DIMENSIONAL WEAVES

Harry A. Holman, Ladue; Albert W. Kallmeyer, Crestwood; Henry C. Paulsen, Chesterfield, all of Mo., and William W. Weaver, Detroit Lakes, Minn., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

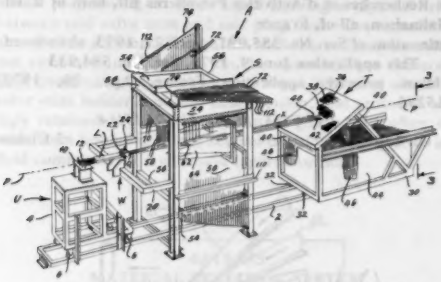
Filed Mar. 12, 1976, Ser. No. 666,241

Int. Cl.² D03D 41/00

U.S. Cl. 139—20 **24 Claims**

1. In a weaving machine having means for positioning a plurality of longitudinal strands in an array with the strands of the array extended generally in the same direction and located generally side by side in both crosswise directions, a shedding apparatus for moving selected strands of the array so as to create shed openings through which other strands may be extended generally through the array in two crosswise direc-

tions so as to form a three dimensional weave, said apparatus comprising: a frame, a plurality of first elongated positioning elements extended crosswise through the array between adjacent longitudinal strands thereof, the first elements being generally parallel to each other; a plurality of second elongated positioning elements extended crosswise through the



array between adjacent strands thereof, the second elements being generally parallel to each other and being located at an angle with respect to the first elements; and actuating means for moving the elements between inner and outer positions so as to increase the spacing between selected adjacent strands of the array and thereby create a shed opening in the array.

4,019,541

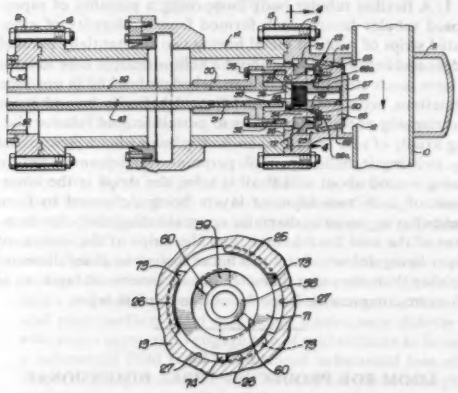
REMOVABLE PLUG FOR PIPE JUNCTION, AND METHOD AND APPARATUS FOR INSTALLING

Leo T. Koppl, 1432 S. Birch, Montebello, Calif. 90640

Filed Sept. 8, 1975, Ser. No. 611,124

Int. Cl.² F16L *55/10*

U.S. Cl. 139—94 **9 Claims**



1. In a device for plugging a pipe having a frusto-conical seat therein, the combination of:

a frusto-conical plug member adapted to seat on the pipe seat in fluid-tight relation therewith;

a generally circular plate member axially aligned with said plug member and threaded thereinto and axially movable relative thereto in one direction; and

an annular locking collar axially aligned with said plate member and carried thereby and axially movable thereby in said direction, adapted to engage and cooperate with the pipe when said collar is moved in said direction to lock the plate member and plug member against axial movement away from the seat of the pipe.

4,019,542

LUG STRAP

Joseph A. Arsenault, Concord, N.H., assignor to Page Belting Company Incorporated, Concord, N.H.

Filed Feb. 6, 1976, Ser. No. 655,776

Int. Cl.² D03D *49/40*

U.S. Cl. 139—153 **4 Claims**

1. Lug strap for use with a picker stick, comprising

a. two parallel elongated legs,

b. a bight being formed of a webbing of woven fibers of nylon the webbing being impregnated with polyurethane, the bight being formed with a central portion extending perpendicular to the longitudinal direction of the legs and with two transition portions each leading angularly from the end of one leg to the adjacent end of the central portion, the central portion having an inner surface that is curved in planes parallel to the inner sufaces of the legs, and

c. a pad of solid urethane located on the inner surfaces of the central portion and the transition portions.

4,019,543

METHOD OF FIXING AN END PORTION OF A LINE TO A REEL

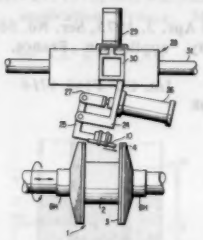
Kichiro Sasaki, Takatsuki; Kazuo Takeuchi, Suita; Shiro Kazitani, Kobe; Kazuo Shimizu, Kobe, and Yoshiteru Yoshida, Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Feb. 25, 1975, Ser. No. 552,878

Claims priority, application Japan, Feb. 25, 1974, 49-22047

Int. Cl.² B21F *3/027;* **B65H** *75/28*

U.S. Cl. 140—111 **5 Claims**



1. A method of fixing a wind-terminating end portion of a wound metal wire to a flange portion of a reel comprising the steps of:

stopping the rotation of said reel after a predetermined amount of wire has been wound upon said reel;

fixedly holding the rear portion of said wire;

plastically bending said wind-terminating end portion of said wire so as to form a substantially U-shaped recession within said wind-terminating end portion of said wire which extends transversely to the longitudinal direction of said wire;

disposing said bent wind-terminating end portion of said wire within a groove provided within the end of a means for inserting said wind-terminating end portion of said wire within said flange portion of said reel so as to facilitate the guidance of said wind-terminating portion of said wire during said insertion thereof within said reel;

moving said inserting means so as to insert said U-shaped recessed portion of said wire into an appropriately configured slot provided within said flange portion of said reel; and

cutting said wind-terminating end portion of said wire.

4,019,544
APPARATUS FOR FORMING A CONTINUOUS WIRE INTO A MAT

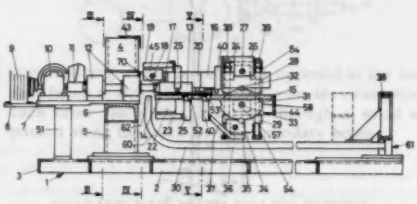
Hans Jäggi, Wangen; Ernesto Lehmann, Neuhausen, and Hugo Rechsteiner, Schaffhausen, all of Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

Filed Oct. 2, 1975, Ser. No. 618,932

Claims priority, application Switzerland, Oct. 9, 1974, 13547/74

Int. Cl.² B21F 27/10

U.S. Cl. 140—112 15 Claims



1. Apparatus for the manufacture of mats from a continuous wire, such as a plastic-coated wire, with the wire being folded back and forth into juxtaposed wire sections joined by return bends at the opposite ends of each wire section, comprising a winding plate having a first surface and an oppositely facing second surface with a leading edge along one side and a trailing edge along the opposite side thereof, a pair of laterally spaced substantially parallel spindles located opposite and adjacent to the first surface of said plate, the axes of said spindles being substantially parallel to the first surface of said winding plate and extending in the direction between said leading and trailing edges, a wire feed member located opposite the second surface of said winding plate, said winding feed member having a wire outlet located adjacent the leading edge of said winding plate and a wire inlet spaced from said wire outlet in the direction extending from the leading edge toward the trailing edge of said winding plate, means supporting said wire feed member for swinging said member in an arc extending transversely of the direction extending between the leading edge and trailing edge so that the wire outlet can be displaced in a path extending generally along the leading edge of said winding plate, each said spindle having a helically shaped wire guide located adjacent the leading edge of said winding plate and a screw thread extending from said wire guide in the direction toward the trailing edge of said winding plate, means for rotating each of said spindles in an opposite direction to the direction of rotation of the other said spindle, each said screw thread having a pitch corresponding substantially to the wire diameter of the mat to be formed and each said helically shaped wire guide having a pitch significantly greater than the pitch of said screw thread.

4,019,545
SAMPLE FRACTION COLLECTOR

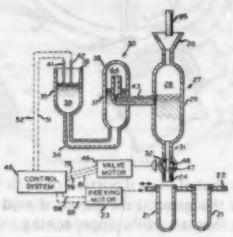
James E. Vinatieri, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 29, 1975, Ser. No. 645,180

Int. Cl.² B65B 3/36, 43/60

U.S. Cl. 141—130 5 Claims

1. Apparatus for sequentially dispensing a plurality of uniform volume samples of a liquid material, comprising means defining a sample chamber having a sample inlet and a sample outlet; means for continuously introducing liquid to be sampled through said sample inlet into said sample chamber; valve means having a valve inlet, a valve outlet, and a rotatable valve element having a passageway therethrough to provide liquid communication between said valve inlet and said valve outlet when said valve element is in the open position and to block liquid communication between said valve inlet and said valve outlet when said valve element is in the closed position; means for rotating said valve element from each of said open and closed positions to the other of said open and closed positions; means connecting said valve inlet to said sample outlet; outlet conduit means connected to said valve outlet and having a dispensing end; rack means for sequentially positioning individual sample receptacles beneath said dispensing end of said outlet conduit means; a generally U-shaped tube having first and second substantially vertical legs with liquid communication therebetween, one of said legs having a closed end and the other of said legs having an open end; said U-shaped tube legs and ends being adapted to contain an electrolytic solution therein; a generally L-shaped tube extending from said means defining a sample chamber, at a level in said sample chamber substantially below the level reached in said sample chamber by the desired volume of sample liquid, into said one of said legs having a closed end and then upwardly toward said closed end to a point above the maximum level of electrolyte solution in said one of said legs having a closed end, to provide fluid communication between



said sample chamber and the interior of the upper portion of said one leg; first and second electrode means positioned in said open end of the said other leg to contact the electrolytic solution when the desired volume of sample liquid has accumulated in said sample chamber; whereby sample liquid entering the generally L-shaped tube causes an increase in the fluid pressure in the closed end of said one leg, thereby causing movement of part of the electrolytic solution from said one leg toward said other leg, thereby causing said electrolytic solution to contact both of said first and second electrode means; and control means responsive to each occurrence of the electrolytic solution contacting both of said first and second electrode means to actuate said rack means to move a sample receptacle beneath said dispensing end of said outlet conduit means and then to actuate the valve element rotating means to rotate said valve element to the open position for a predetermined drain interval to drain the sample liquid accumulated in said sample chamber into the sample receptacle positioned beneath said dispensing end of said outlet conduit means.

4,019,546
ROTARY PACKER AND METHOD OF FILLING BAGS

Niels E. Hastrup, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed July 17, 1975, Ser. No. 596,599

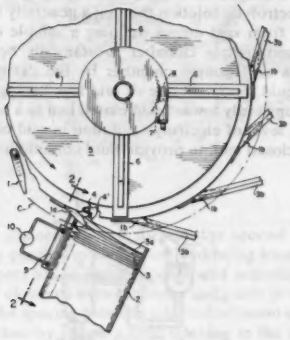
Claims priority, application United Kingdom, July 18, 1974, 31953/74

Int. Cl.² B65B 1/04

U.S. Cl. 141—10 40 Claims

1. A method of introducing material by means of a rotary packer into bags such as sacks defining at least one opening at one end portion and positioned in at least one carrying means including rotary packing means having a plurality of bag filling spouts positioned about peripheral portions so as to be rotatable therewith, said spouts further being movable from positions generally radial relative to said rotary packing means toward positions generally tangential relative to peripheral portions of said rotary packing means, means to supply material to said spouts for filling said bags with material to predetermined levels comprising:

a. positioning said bag carrying means adjacent said rotary packing means in a manner such that at least one bag is positioned at least adjacent a path defined by said spouts;
b. rotating said rotary packing means about its axis in a direction such that said bag filling spouts traverse a generally arcuate path and successively approach said bag carrying means in the direction of rotation;
c. successively rotating each bag filling spout about an axis associated therewith toward positions generally tangential relative to peripheral portions of said rotary packing



means such that at least a portion of each bag filling spout approaches the general direction of said opening of the bag closest thereto while approaching said bag carrying means;
d. successively permitting each bag filling spout to enter said opening of the bag closest to said spout and transporting said bag therewith away from said bag carrying means as said rotary packing means is rotated; and
e. introducing material from said filling spout into said bag as said bag is positioned about the filling spout and transported away from the bag carrying means.

4,019,547

CAN FILLING METHOD AND APPARATUS

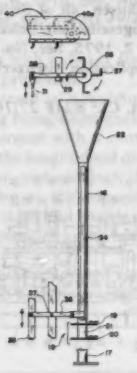
Edward E. Ross, San Rafael, Calif., assignor to Del Monte Corporation, San Francisco, Calif.

Continuation of Ser. No. 469,089, May 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 366,414, June 4, 1973, abandoned. This application Mar. 22, 1976, Ser. No. 669,327

Int. Cl.² B65B *1/08*

U.S. Cl. 141—11 **15 Claims**

1. In a method of successively filling containers with wet food material, making use of a vertically extending unobstructed tube having cut-off means at its lower end, the steps of continuously supplying the material to a region above the upper open end of the tube and causing free-falling movement of the same into the upper tube portion to form a column of the material of predetermined height within the tube, continuously shaking the tube in a vertical direction to cause the column of material to move freely downwardly through the tube, causing the material in the column to be subjected only to gravity compacting pressure which gradually increases to a predetermined degree of compaction toward the lower end of the tube whereby for the lower portion of the column there is a predetermined fixed ratio of volume to weight, and recurrently cutting off lower end portions of the pressure com-



pacted column that are of equal volume and causing such portions to be transferred to containers.

4,019,548

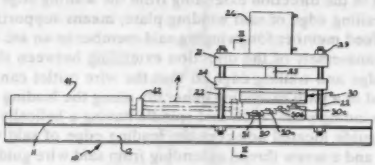
MACHINE FOR SHEAR-SLICING WOOD

Thomas A. Lenderink, and Roger P. Hordyk, both of Plainfield Township, Kent County, Mich., assignors to Lenderink, Inc., Belmont, Mich.

Filed Feb. 2, 1976, Ser. No. 564,337

Int. Cl.² B27C *1/00*

U.S. Cl. 144—175 **19 Claims**



1. A device for separating a wood block by shearing it into a plurality of sheet-like strips, said device including a plurality of rigidly supported, vertically spaced shearing knives, said knives arranged one behind the other to form a shearing zone, a wood block supporting base and means for forcing a wood block along said base and past said knives, the improvement in said device comprising: a pressure applicator having a surface for engaging the face of a wood block opposite from said base; said surface being formed of a plurality of separate elements extending the full width of the wood block and resilient means for separately urging each of said elements against the wood block, said applicator extending the entire length of said shearing zone and downstream of the last of said knives.

4,019,549

WOOD SPLITTING APPARATUS

Thurston V. Williams, Pead Hill, Wilton, N.H. 03086

Filed Mar. 19, 1976, Ser. No. 668,474

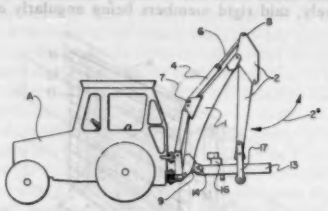
Int. Cl.² A47J *49/02*; B27L *7/00*

U.S. Cl. 144—193 A **9 Claims**

1. A wood splitting attachment for a backhoe having a main boom and a secondary boom pivotted thereto, the attachment comprising:

an elongate guide track, means for mounting the track on the backhoe extending toward the secondary boom,

a follower slidingly engaging the guide track and including means for connecting the follower to the secondary boom so as to guide the secondary boom along the track, and



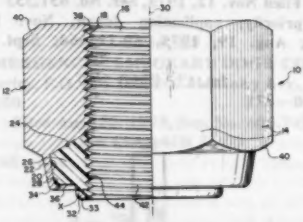
a wood splitting wedge on the track opposed to the secondary boom so that when the two booms are swung toward each other the wedge is driven through a wood stick pushed along the track by the secondary boom.

4,019,550

SEALING NUT WITH NYLON INSERT

Lon DeHaitre, Arlington Heights, Ill., assignor to Abbott Screw & Mfg. Co., Chicago, Ill.

Filed June 9, 1975, Ser. No. 584,922
Int. Cl.² F16B *39/34*
U.S. Cl. 151—7 **15 Claims**



1. A sealing nut which is adapted to be screwed onto a male threaded stud or the like and brought into axial end engagement with the bearing surface of a body through which the stud threadedly extends in order to seal the joint defined by the stud and body and to lock the nut onto the stud while the joint is so sealed, the nut comprising:

A. a nut body of metal having a central independently fabricated insert of a relatively stiff, high durometer polyamide resin arranged coaxially therewith and at one end thereof,

B. the body and insert being locked together and there being a continuous threaded bore in the nut with a portion of the bore being in the body and a portion of the bore being in the insert,

C. the insert having a shoulder at an axial end thereof and the body having an integral, generally cylindrical wall terminating at said one end in an angular radially inwardly bent over lip engaging the shoulder to provide for said locking of said insert, said insert additionally having an axially extending, integral relatively thin crown adjacent the insert bore and having at least a portion of said threaded bore on the inner surface of said crown which is spaced radially inward from the lip to provide an annular axially facing gallery between lip and crown,

D. the lip being the limit to which the nut body extends axially at said one end,

E. the axial length of the crown before the nut has been used being such that the free end thereof is spaced substantially beyond the lip in an axial direction away from the nut body,

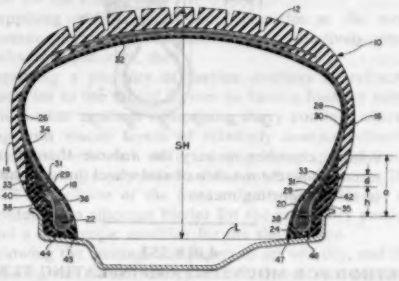
F. the crown being inverted in a radially outward direction when pressed axially against a bearing surface by screwing said nut towards said surface such action tending to produce a turtle-neck-like fold and bringing a substantial portion of the crown end into the gallery to occupy substantially all of said gallery.

4,019,551

CHIPPERLESS RADIAL PLY TIRE

Michael A. Kolowski, Tallmadge, and George J. Siefert, North Canton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 23, 1976, Ser. No. 651,746
Int. Cl.² B60C *15/06, 9/02*
U.S. Cl. 152—354 **9 Claims**



1. A pneumatic tire having a tread portion, a pair of sidewall portions, a pair of bead portions and a carcass structure extending circumferentially about the tire and from bead portion to bead portion, said tire being characterized by the carcass plies being turned axially outwardly about and radially outwardly of each bead core to a point between one and three times the thickness of the bead core radially outwardly of the bead core with the centerline of at least the radially outer two-tenths of an inch of the turned-up portion of the carcass structure being no further removed from the neutral stress line than one and one-half times the thickness of the carcass structure, an air impervious inner liner extending about the bead core and completely encasing the carcass plies and an annular hard rubber chafer strip disposed axially outwardly of the turned-up portion of the carcass ply and extending from a point axially adjacent the radially outer extremity of the bead core to a point radially outwardly of the terminus of the air impervious inner liner.

4,019,552

REMOTE CONTROL OF PNEUMATIC TIRE PRESSURE AND ITS APPARATUS

Yasuo Tsuruta, 22-2, 4-chome, Sanno, Ota, Tokyo, Japan

Filed Jan. 30, 1975, Ser. No. 545,631
Claims priority, application Japan, Mar. 30, 1974, 49-036154
Int. Cl.² B60C *23/10*
U.S. Cl. 152—417 **8 Claims**

1. Apparatus for controlling the pressure in a pneumatic tire on a vehicle equipped with a wheel carrying said tire and supporting means on which said wheel is mounted for rotation relative to said supporting means, said apparatus comprising:

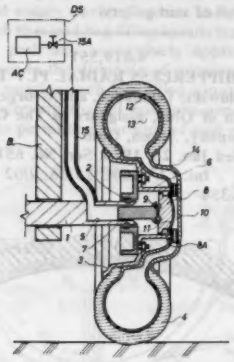
a first variable volume chamber at least partially defined within said supporting means, the volume of which chamber is responsive to changes in fluid pressure supplied thereto from a remotely controlled source of pressure fluid,

a first piston responsive to changes in the pressure within said chamber,

a second variable volume chamber in said wheel,

said second chamber having a flexible wall and being completely sealed except for means connecting said second chamber to a space within a tire when said tire is mounted on said wheel,

and thrust bearing means for transmitting the movement of said piston to the flexible wall of said second variable



volume chamber to vary the volume thereof, without transmitting the rotation of said wheel through said piston to said supporting means.

4,019,553

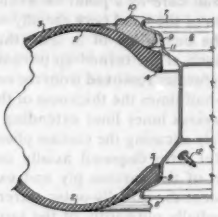
METHOD FOR MOUNTING AND INFLATING TUBELESS TIRES

James I. Lefgren, 311 E., 160 S., Smithfield, Utah 84335

Filed Dec. 24, 1975, Ser. No. 644,099

Int. Cl.² B60C 25/00

U.S. Cl. 157—1.1 **7 Claims**



1. The method for mounting and inflating a tubeless, pneumatic tire on a wheel rim comprising the steps of:

placing the tire on the wheel rim so that its side-wall beads are inside the flanges of the wheel rim;

filling any gap between a tire side-wall bead and its adjacent wheel-rim flange with partially water soluble material of doughy consistency; and

introducing pressurized air into the tire, whereby at least one tire bead is forced against the adjacent wheel-rim flange and the partially water soluble doughy material is forced out of the gap.

4,019,554

THERMAL INSULATING CURTAIN, ESPECIALLY FOR USE IN GREENHOUSES

Max Otto Henri Rasmussen, Rabjerg 7, 2690 Karlslunde, Denmark

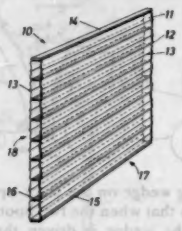
Filed Apr. 25, 1975, Ser. No. 571,486

Claims priority, application Denmark, Apr. 29, 1974, 2346/74

Int. Cl.² E06B 3/9

U.S. Cl. 160—84 R **9 Claims**

1. A heat insulating collapsible curtain comprising a plurality of parallel tubular members of plastic foil having adjoining sides bonded together to form lamellae along the bonded areas, the sides of the members extending in parallel planes connected by said lamellae, so as to form a curtain with spaced walls, a rigid member fastened along the upper and lower surfaces of the top and bottom tubular members, respectively, said rigid members being angularly adjustable to



move the spaced walls of said curtain in their respective planes and move the lamellae angularly relatively to said walls, each of said tubular members having creases along opposite sides to form folding lines for flattening the tubular member, so that said curtain may be collapsed by flattening all said tubular members, thereby forming a stack of such flattened members.

4,019,555

WINDOW WITH VENTILATING CAPABILITY

Seiri Oshiro, 27-banchi 7, Kyohara, Naha, Okinawa, Japan

Filed Nov. 12, 1975, Ser. No. 631,333

Claims priority, application Japan, Nov. 15, 1974, 49-132334; Aug. 19, 1975, 50-114664; Sept. 4, 1975, 50-122603

Int. Cl.² E06B 5/00

U.S. Cl. 160—371 **5 Claims**

1. A window with a ventilating capability that does not decrease the insulating effect comprising a window sash, a plurality of net screens disposed within said sash at regular spaced intervals and forming insulating air layers between opposed pairs of net screens, a porous sheet material, adhesive means securing said porous sheet material to at least one side of at least one of said net screens, said window sash being provided with a plurality of grooves formed around the inner portion thereof, retaining bars accommodated with said grooves, said retaining bars securing the peripheral edges of said net screens within said grooves.

4,019,556

AIR CONDITIONER COVER

Arthur G. Selger, 154 Johnson Ave., Dumont, N.J. 07628

Filed Apr. 28, 1976, Ser. No. 681,135

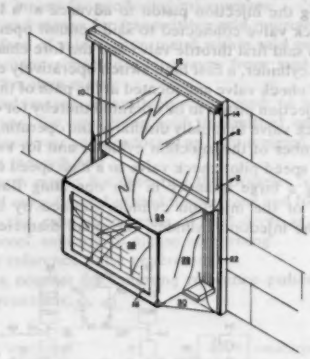
Int. Cl.² A47G 5/02

U.S. Cl. 160—238 **5 Claims**

1. A cover for a window air conditioner unit projecting outwardly from a window frame comprising:

a window shade roller adapted to be mounted on the top of a window frame;

a flexible sheet of transparent plastic material having a plurality of foldable panels which form a box-like shape



to cover an air conditioner unit attached to said window shade roller; and

means on the periphery of said flexible sheet for continuously fastening said sheet to a window frame.

4,019,557

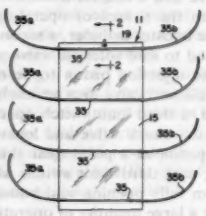
EMERGENCY TEMPORARY DOOR COVER

John J. Earley, P.O. Box 196, 207 McKinley Ave., Lansdowne, Pa. 19050

Filed Aug. 22, 1975, Ser. No. 606,749

Int. Cl.² A47H *33/00*

U.S. Cl. 160—354 **7 Claims**



1. An emergency temporary door cover for covering a broken glass door pane until the broken glass pane can be replaced comprising

a cover sheet large enough to cover the pane area of a door, said sheet being foldable for easy storage when not being used to a cover a door pane area,

suspension means extending from the top of the sheet for suspending the sheet from the top of the door,

and grasping means extending outwardly from the sides of the sheet for grasping the side edges of the door to spread the sheet laterally and hold it temporarily in place against the front of the door until the sheet can be fastened to the door,

said suspension and grasping means being operable from the front of the door,

said grasping means being permanently attached to said sheet, and

fastening means for fastening the cover sheet to the door and extending from the sides of the sheet and held by the grasping means across the rear of the door until an installer can operate the fastening means.

4,019,558

METHOD OF FORMING FOUNDRY MOULDS

Ervin I. Szabo, Manotick, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Aug. 20, 1976, Ser. No. 716,356

Claims priority, application Canada, Sept. 26, 1975, 236501

Int. Cl.² B22C *9/04*

U.S. Cl. 164—26 **6 Claims**

1. A method of forming a foundry mould, comprising:

a. applying an initial coating of refractory particles, to a meltable mould former, from a slurry having a suspended solids content in the range 30 to 50% by volume of the total volume of the slurry, and containing a siliceous binder for the refractory particles and a thixotropic modifier for the slurry, then

b. applying additonal refractory particles to the mould former, in the form of a stucco layer of relatively coarser refractory particles, then

c. applying a plurality of further coatings of refractory particles to the mould former to form a foundry mould, the further coatings comprising slurry coatings alternating with stucco layers of relatively coarser refractory particles, with each slurry coating being applied from a slurry having a suspended solids content is the range 20 to 40% by volume of the total volume of the slurry, and containing a siliceous binder for the refractory particles and a thixotropic modifier for the slurry, then

d. allowing the coatings and layers to set and dry, and then

e. heating the mould former to melt it and then removing the molten mould former material from the foundry mould, and wherein

f. the thixotropic modifier comprises particles of at least one substance selected from the group consisting of aluminum alkoxides, aluminum aryloxides, clays, carbon blacks, fumed silicas, fumed alumina, fumed titanium oxide, fumed zirconium oxide, fumed hafnium oxide and fumed chromium oxide.

4,019,559

METHOD OF FORMING A FOUNDRY MOLD

Ervin I. Szabo, Manotick, Canada, assignor to Canadian patents and Development Limited, Ottawa, Canada

Filed Aug. 20, 1976, Ser. No. 716,358

Claims priority, application Canada, Dec. 30, 1975, 242825

Int. Cl.² B22C *9/04*

U.S. Cl. 164—26 **7 Claims**

1. A method of forming a foundry mould, comprising:

a. applying an initial coating of refractory particles, to a mould former, from a first slurry comprising the refractory particles and a binder therefor, the first slurry having a suspended solids content in the range 30% to 55% by volume of the total volume of the slurry, then

b. applying additional refractory particles to the mould former, in the form of a first stucco layer of relatively coarser refractory particles, then

c. applying a second refractory particle binder coating to the stucco layer, then

d. applying additional refractory particles, to the coated mould former, in the form of a second, stucco layer of relatively coarser refractory particles, then

e. applying a third refractory particle binder coating to the second, stucco layer, then

f. repeating steps (b) to (e) in the same order and finishing with one of the refractory particle binder coatings, to form a foundry mould, then

g. allowing the coatings and layers to set and dry, and then

h. heating the mould former to melt it and then removing the molten mould former material from the foundry mould, and wherein the improvement comprises:

i. the refractory particle binders of steps (a) and (e) are substantially immiscible with the refractory particle binder of step (b),

j. at least one of the refractory particle binders of steps (c)

and (e) is a slurry containing refractory particles and having a suspended solids content in the range 20% to 40% by volume of the total volume of the slurry, and

k. each of the refractory particle binders comprises at least one substance selected from the group consisting of partially hydrolized, organo silicon compounds and alcohol tolerant non-alkaline aqueous colloidal silicas.

4,019,560

SPRAY COOLING OF CONTINUOUSLY CAST INGOTS

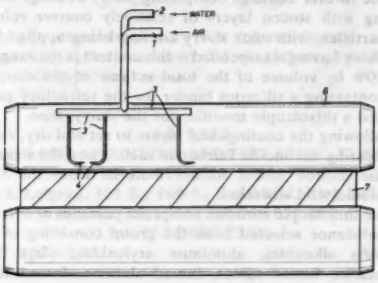
Hans Gruner, Duisburg-Rahm; Gerd Diederich, Angermund; Hans Butz, Duisburg; Peter Wahls, Meerbusch, and Engelbert Weins, Duisburg, all of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Sept. 18, 1975, Ser. No. 614,534

Claims priority, application Germany, Sept. 16, 1974, 2444613

Int. Cl.² B22D *11/12*

U.S. Cl. 164—89 **9 Claims**



1. Apparatus for spray cooling a continuously cast ingot as withdrawn from the mold by plural rolls arranged along the ingot and having horizontal axes, the rolls each extending for at least the width of the ingot in undivided configuration, comprising:

a plurality of nozzles arranged between respective two vertically spaced rolls and one each side of the ingot;

means for mixing a coolant with a pressurized propellant and for accelerating the coolant by the propellant prior to feeding the coolant to said nozzles; and

the nozzles disposed and constructed to cause wide fan - out flow against the surface of the ingot, beginning along an axis extending parallel to the surface.

4,019,561

INJECTION APPARATUS FOR DIE CAST MACHINES

Kazuteru Aoki, Zama, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

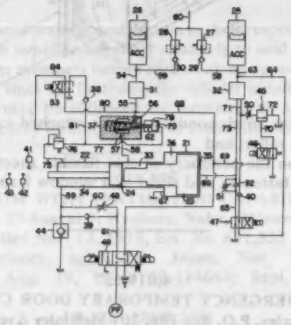
Filed Feb. 7, 1975, Ser. No. 547,813

Claims priority, application Japan, Feb. 12, 1974, 49-16929

Int. Cl.² B22D *17/32*

U.S. Cl. 164—155 **5 Claims**

1. In an injection apparatus for a die casting machine comprising an injection cylinder containing an injection piston for injection molten metal into metal mold of the die cast machine; a booster cylinder including a small diameter portion connected to said injection cylinder and a large diameter portion; a booster piston contained in the booster cylinder having a small diameter piston portion operatively connected to said injection piston through operating fluid in a large diameter piston portion contained in the large diameter portion of said booster cylinder, said large diameter portion of said booster piston being slideably contained in the large diameter portion of said booster cylinder to define a rear chamber and a fore chamber; a source of pressurized operating fluid; a low-high speed pilot valve connected between said source of operating fluid and the rear chamber of said injection cylinder, said low-high speed pilot valve being set at a low speed condition at the start of the injection operation, a first throttle valve connected to a conduit for discharging the operating fluid in a fore chamber of the injection cylinder defined by the injection cylinder and injection piston thereby permitting the injection piston to advance at a low speed; a pilot check valve connected to said conduit operatively connected to said first throttle valve and the fore chamber of said injection cylinder, a first limit switch operatively connected to said pilot check valve and located in the path of the movement of said injection piston to be operated thereby for opening said pilot check valve to rapidly discharge the operating fluid in the fore chamber of the injection cylinder and for switching said low-high speed pilot check valve to a high speed condition for supplying a large quantity in the operating fluid to a rear chamber of the injection cylinder defined by the injection piston, the injection cylinder, the small diameter portion of



the booster cylinder and the small diameter portion of the booster piston so as to advance the injection piston at a high speed, a booster pilot valve connected between said source of operating fluid and the rear chamber of the booster cylinder, a solenoid valve and a second throttle valve which are connected between the source of operating fluid and the rear chamber of the booster cylinder, a second limit switch operatively connected to said solenoid valve and positioned along the path of the injection piston to be operated thereby for opening said solenoid valve thus advancing the booster piston at a low speed, a third limit switch operatively connected to said booster pilot check valve and located along the path of the injection piston at a point near the limit of pouring of molten metal, said third limit switch when actuated by the injection piston fully opening said booster pilot check valve thus admitting a large quantity of operating fluid into the rear chamber of the booster cylinder for advancing the booster piston at a high speed.

4,019,562

AUTOMATIC MOLDING APPARATUS WITH MEANS FOR CONTROLLING POURING RATE

Toshio Shiraiwa; Sumio Kobayashi, both of Amagasaki; Katsukiyo Marukawa, and Syoji Anezaki, both of Ibaragi, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Oct. 15, 1975, Ser. No. 622,730

Claims priority, application Japan, Nov. 21, 1974, 49-134506

Int. Cl.² B22D *37/00*

U.S. Cl. 164—155 **12 Claims**

1. An automatic molding apparatus comprising:

a container filled with molten metal;

a mold into which said molten metal is fed from said container;

said container having a nozzle through which said molten metal is fed to said mold;

said nozzle having stopper means for adjusting the quantity of said molten metal passing through said nozzle;

means for detecting the rate of increase of the level of said molten metal within said mold without contacting said mold, said detecting means comprising:

a. first means for producing microwaves;

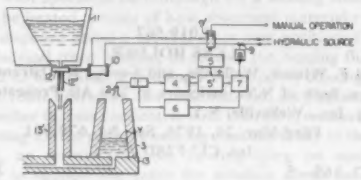
b. second means for transmitting said microwaves to the surface of said molten metal within said mold and for receiving reflected microwaves from said surface of said molten metal;

c. third means, operatively connected to said second means, for combining said transmitted and reflected microwaves and producing an output signal representative thereof; and

d. fourth means for detecting the Doppler frequency of said output signal of said third means and for determining the rate of increase of said level as a function thereof, said fourth means comprising:

i. a reference pulse generator;

ii. a counter for counting reference pulses from said generator;



iii. means for producing pulses synchronized with said Doppler frequency of said output signal of said third means;

iv. means, connected to said counter and said pulse producing means, for resetting said counter by said synchronized pulses;

v. temporary memory means for storing a counted output from said counter; and

vi. means for computing said rate of increase of said level as a function of an output of said temporary memory and for producing a detected rising speed signal representative thereof;

means for producing a speed pattern signal representative of a desired molding speed pattern; and

means, connected to said stopper means and responsive to an error between said detected rising speed signal and said speed pattern signal, for controlling operation of said stopper means and therefore the quantity of said molten metal passing through said nozzle.

4,019,563

METHOD AND APPARATUS FOR CONTROLLING THE BATCHING OF A MELT FOR PRESSURE TAPPING FURNACE

Kjell Bergman, and Lars Carlsson, both of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Nov. 7, 1975, Ser. No. 629,990

Claims priority, application Sweden, Nov. 11, 1974, 7414101

Int. Cl.² 222 *595*; B22D *37/00, 39/00*

U.S. Cl. 164—155 **16 Claims**

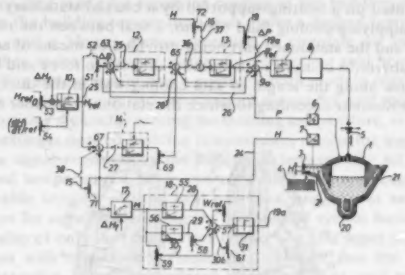
14. A method for batching a metal melt such as steel for a pressure tapping furnace comprising:

a. developing a signal representing melt flow;

b. determining the integral of said melt flow signal;

c. determining the rate of change of said melt flow signal; and

d. terminating batching when the sum of a predetermined constant, the melt flow, the integral of said melt flow and



said rate of change of melt flow are a predetermined level.

4,019,564

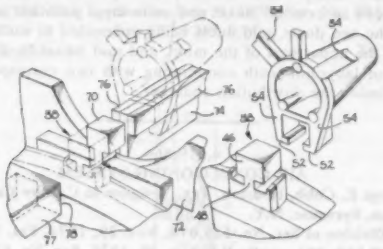
CASTING SUPPORT FOR AUTOMATIC CAST TRIM MACHINES

Victor O. Anderson, 17250 S. Main St., Gardena, Calif. 90248

Filed Nov. 5, 1975, Ser. No. 628,992

Int. Cl.² B22D *17/22*

U.S. Cl. 164—271 **13 Claims**



1. A casting support for an automatic cast-trim machine comprising a member for fitting between the stationary platen and the moving platen to define part of the closed mold cavity, said member having means for mounting said member to an indexing system, said member having first and second faces for face to face disposition with the stationary platen and moving platen mold halves, respectively, said member having an outer extension with first and second sides for extending into the mold cavity about which a casting may be formed, said member having on each of said first and second sides a means for entrapping a portion of a casting formed about said member and preventing said portion of the casting from spreading away from said outer extension, whereby said casting will be encouraged into tight grip on said outer extension upon cooling and shrinkage of the casing.

4,019,565

INGOT MOLD FOR CONTINUOUS ROTARY CASTING

Michel Mola, Paris, France, assignor to Creusot-Loire Vallourec, Paris, France

Filed Aug. 9, 1976, Ser. No. 712,966

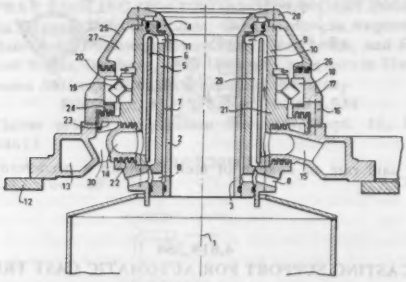
Claims priority, application France, Aug. 14, 1975, 75.25325

Int. Cl.² B22D *11/04*

U.S. Cl. 164—283 M **6 Claims**

1. In an ingot mold for substantially vertical continuous rotary casting, which mold is externally cooled by the circulation of a cooling fluid and comprises a rotary member

mounted on bearings and having a cooling wall the external surface of which is cooled by a concentric duct having an outlet in the lower part of the mold, said rotary member being mounted on a bearing supported by a coaxial stationary part for supplying cooling fluid thereto, a seal between the rotary part and the stationary part being provided by means of annular labyrinths comprising a plurality of teeth to force said fluid to flow along the length of said cooling wall in the duct, the improvement according to which the stationary member com-



prises a fluid distributing chamber positioned in the lower part of the ingot mold above the outlet of said first-mentioned duct beneath said bearing, and opening into a second duct formed in the rotatary member, concentrically 6ith the first duct, between an external jacket and an internal partition separating the two ducts, said ducts being connected to each other near the upper part of the mold, and said jacket having two sets of labyrinth teeth cooperating with two corresponding sets inside the distribution chamber.

4,019,566

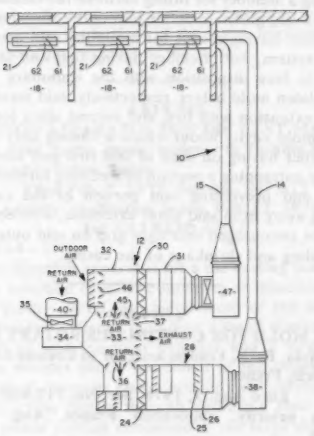
AIR CONDITIONING SYSTEM

George E. Cobb, Houston, Tex., assignor to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 528,074, Nov. 29, 1974, Pat. No. 3,949,810. This application Jan. 20, 1976, Ser. No. 650,659

Int. Cl.[2] F25B *29/00*

U.S. Cl. 165—2 2 Claims



1. A method of operating an air conditioning system for conditioning air in a plurality of enclosed areas in a building comprising the steps of:

delivering a stream of air conditioned to a relatively constant cold temperature level to a terminal provided in each of the areas;

regulating the quantity of relatively cold conditioned air discharged into the area in accordance with the temperature level therein;

generating a control signal, the magnitude thereof varying in accordance with the quantity of constant temperature conditioned air supplied to the area;

monitoring the magnitude of the control signal; and

activating a warm air supply terminal when the magnitude of the control signal indicates that the quantity of constant temperature relatively cold air discharged into the area has decreased below a predetermined level.

4,019,567

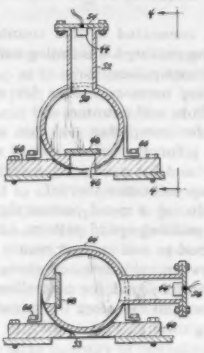
LENS HOLDER

Donald F. Wixson, Wellsville, and George K. Ostrander, Angelica, both of N.Y., assignors to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Mar. 24, 1976, Ser. No. 670,011

Int. Cl.[2] F28D *19/04*

U.S. Cl. 165—5 3 Claims



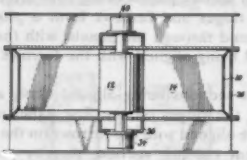
1. A heat exchanger having a housing wall including spaced inlet and outlet ducts for a heating fluid and for a fluid to be heated, a matrix of heat absorbent material carried in said chamber, means for subjecting said matrix to the heating fluid and to the fluid to be heated, an opening in the housing of the heat exchanger axially spaced from said matrix and arranged to receive infra-red rays radiating therefrom, a cylindrical lens housing for an infra-red ray detector lying laterally adjacent the opening in said heat exchanger housing and having an opening in the peripheral wall thereof that coincides with the opening in the heat exchanger housing, an infra-red ray detector in the lens housing lying opposite the opening therein to receive the infra-red rays emitted from said matrix, a lens covering the opening in said lens housing, and yoke means encircling the cylindrical lens housing holding said housing laterally adjacent the heat exchanger housing whereby said lens housing may be rotated about its axis to selectively align the opening in the heat exchanger housing and the opening in the lens housing.

4,019,568

ROTOR CENTERING DEVICE

Tadek Brzytwa, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Jan. 22, 1976, Ser. No. 651,309
Int. Cl.² F28D 19/04
U.S. Cl. 165—8 5 Claims



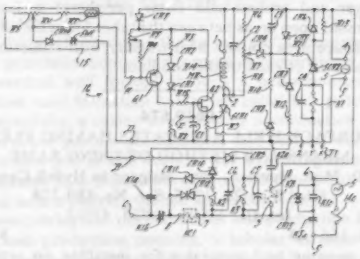
1. Rotary regenerative heat exchange apparatus including a cylindrical rotor housing having end plates at opposite ends thereof with apertures therethrough for a heating fluid and a fluid to be heated, a rotor of heat absorbent material concentrically disposed about a vertical rotor post positioned within the cylindrical rotor housing to receive the heating fluid and the fluid to be heated, a housing for a support bearing subjacent the rotor having an annular shelf with a cylindrical central chamber therein concentric with the rotor, means affixing the housing for the support bearing concentrically to the rotor housing, an annular support bearing lying on said shelf adapted to support the rotor for rotation about its axis, a centering device in the central chamber having a disc with an axially aligned stem attached to the rotor post, said disc having a bearing contact with the arcuate walls of the cylindrical chamber, and a radial guide bearing adapted to replace said centering device having substantially the same diameter as said centering device and adapted to extend concentrically through the cylindrical chamber to the rotor post to position said post concentric with the central chamber and to prevent lateral displacement of the rotor.

4,019,569

BURNER CONTROL CIRCUIT

Wilbur S. McMann, Utica, and Charles Stang, Jr., Detroit, both of Mich., assignors to Maxitrol Company, Southfield, Mich.

Division of Ser. No. 347,618, April 4, 1973, Pat. No. 3,838,811. This application Sept. 24, 1974, Ser. No. 508,847
Int. Cl.² F25B 29/00
U.S. Cl. 165—26 23 Claims



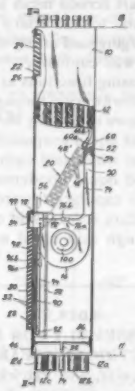
1. In a heating/cooling system selectively operable to a heating mode and to a cooling mode for controlling the temperature of a building space wherein there are provided a heater means operative in the heating mode including a burner means operable from a source of gas to supply heat to the building space and a valve means for controlling the flow of gas from the source to the burner meas such that the flow of gas to the burner means is modulated over a range of flow rates in accordance with building demand to maintain a desired building temperature, a refrigeration means operative in the cooling mode for supplying cooling to the building space when the building temperature rises above a desired temperature, and a blower means operative to circulate air in the building space: a control system for controlling said heating-/cooling system comprising a control circuit module comprising a control circuit and input circuit means for said module comprising means for sensing the building temperature, means for setting a desired building temperature, means for supplying a signal representing the difference between the set and sensed temperatures, mode control switch means selectively operable to cool, off and heat positions, and blower switch means for operating said blower means, said system having a plurality of only four conductors connecting said input circuit means with said control circuit module such that the said refrigeration means is rendered operative when said mode control switch means is cool, said heater means is rendered operative when said mode control switch means is in heat, said heater means and said refrigeration means are rendered inoperative when said mode control switch means is in off, and said blower means is operative from said blower switch means when said mode control switch means is in any of its three operating positions.

4,019,570

HEATING AND COOLING APPARATUS

Sidney Siegel, 989 Schenectady Ave., Brooklyn, N.Y. 11203

Division of Ser. No. 447,784, March 4, 1974, Pat. No. 3,908,750. This application July 9, 1975, Ser. No. 594,228
Int. Cl.² F28F 9/00
U.S. Cl. 165—67 2 Claims



1. A riser-pipe assembly for an air-treatment apparatus, said assembly comprising:

at least two upright riser pipes;

a pair of plates flanking said pipies and each formed adjacent each pipe with a respective upright slit in line with the respective pipe and having a predetermined vertical length; and

at least four resiliently deformable elongated clamp strips arranged in two pairs bridging said plates and each embracing a respective pipe, each strip having one end engaged in a slit of one plate and another end engaged in the corresponding slit of the other plate, said strips each having a vertical height substantially less than said predetermined height of said slits, whereby said pipes and said strips are vertically displaceable relative to said plates, each of said strips having a generally cylindrically arcuate

center region and at each end a generally planar region extending through the respective slit and formed with a bent-over portion preventing withdrawal from said slit, the bent-over portions at each slit extending in opposite directions.

4,019,571

GRAVITY ASSISTED WICK SYSTEM FOR CONDENSERS, EVAPORATORS AND HEAT PIPES

Robert L. Kosson, Massapequa, and John A. Quadrini, Northport, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 31, 1974, Ser. No. 519,788
Int. Cl.² F28D *15/00*
U.S. Cl. 165—105 **27 Claims**

1. A wick system for use in a suitable casing capable of acting as an evaporator, a condenser or a conduit therebetween in a gravity environment in vertical and inclined orientations, comprising:

a casing having an outer wall and an inner wall;

a wall capillary in contact with the inner wall of said casing;

at least one artery structure comprising a plurality of generally unspaced-apart screen mesh layers defining a canal substantially central to said artery structure; and

biasing means for urging said artery structure toward and in contact with the wall capillary,

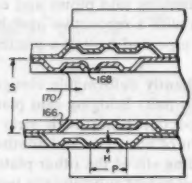
such that when said casing functions as an evaporator, vaporizable liquid flowing downwardly through said canal under the influence of gravity flows outwardly to said wall capillary due to capillary forces, said liquid evaporating when said casing is heated, and, such that when said casing functions as a condenser, vapors of said liquid condensing on said inner wall travel along said wall capillary toward and into said artery structure due to capillary forces, said condensed liquid flowing downwardly through said canal under the influence of gravity.

4,019,572

RADIATOR ASSEMBLY FOR FLUID FILLED ELECTRICAL APPARATUS

Larry R. Harlan, Muncie, and Patrick L. Thiel, Springport, both of Ind., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 23, 1975, Ser. No. 589,098
Int. Cl.² F28D *15/00*
U.S. Cl. 165—106 **5 Claims**



1. A radiator assembly for fluid filled electrical apparatus, comprising:

a plurality of radiator sections each constructed of at least first and second panels; said first and second panels each having a plurality of ridges and furrows forming a corrugated surface;

a header assembly connecting the radiator sections together in flow communication relationship; and

means for connecting the header assembly to the fluid filled electrical apparatus;

said first and second panels being connected together such that said ridges and furrows form a plurality of ducts which extend through the panels, with the ridges of said first panel being aligned with the furrows of said second panel;

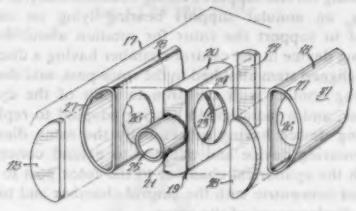
said radiator sections being aligned along a common axis such that the ridges on the first panel of one radiator section are aligned with the furrows on the facing panel of an adjacent radiator section, thereby providing a flow path between said radiator sections which has a substantially constant cross-sectional area.

4,019,573

HEAT EXCHANGER

Arthur B. Modine, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.

Filed Sept. 25, 1975, Ser. No. 616,670
Int. Cl.² F28F *1/02, 1/38, 9/00;* **F28D** *7/00*
U.S. Cl. 165—175 **12 Claims**



1. A heat exchanger for exchanging heat between fluids, comprising: a plurality of conduits for parallel flow of a first fluid through all said conduits, each said conduit comprising a manifold with a first port at one end and a plurality of adjacent second ports spaced from said first port and a plurality of fluid tubes each attached to one of said plurality of ports, the outer peripheral surfaces of the plurality of tubes of each said conduit substantially describing a conduit cylinder and the inner confronting surfaces of said tubes of each conduit being spaced apart to provide an open fluid flow area between the tubes; means for directing a first fluid through all said conduits and thereby all said tubes; and means for directing a second fluid over and around said outer peripheral surfaces and through said open areas between the tubes for achieving maximum surface area contact heat transfer with minimum cross sectional area of each of the conduits.

4,019,574

SUBSURFACE WELL APPARATUS HAVING FLEXING MEANS AND METHOD OF USING SAME

James D. Mott, Houston, Tex., assignor to Hydril Company

Filed May 23, 1975, Ser. No. 580,228
Int. Cl.² E21B *33/035, 43/12*
U.S. Cl. 166—.5 **3 Claims**

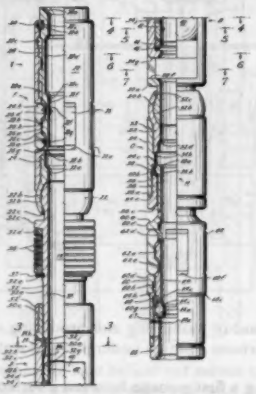
1. A running tool apparatus for installing an articulated surface-controlled safety valve having a valve element and valve operator at a subsurface operating location in a well using through-the-flowline techniques, including:

a running tool body having means for connecting with a carrier tool for moving the running tool to and from the subsurface valve operating location in the well, said running tool body extending within the articulated safety valve body;

means mounted with said running tool body for releasably securing the articulated safety valve with the running tool body;

means mounted with said running tool body for operating the articulated safety valve to releasably secure the safety valve at the subsurface operating location in the well;

means mounted with said running tool body for releasing the secured articulated safety valve from the running tool to enable movement of the running tool from the safety valve; and



said running tool body having a first body portion and a second body portion and means for connecting said first body portion and said second body portion for enabling angular movement of said first body portion relative to said second body portion wherein said running tool body flexes, said means for connecting said first body portion and said second body portion disposed within the articulated safety valve when moving the safety valve to the subsurface operating location.

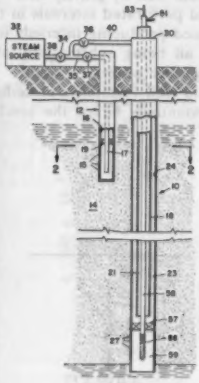
4,019,575

SYSTEM FOR RECOVERING VISCOUS PETROLEUM FROM THICK TAR SAND

Peter Pisio, and Charles F. Kirkvold, both of Calgary, Canada, assignors to Chevron Research Company, San Francisco, Calif.

Filed Dec. 22, 1975, Ser. No. 643,579
Int. Cl.² E21B *43/24*
U.S. Cl. 166—61 **3 Claims**

1. A system for assisting the recovery of viscous petroleum from a petroleum-containing formation comprising a substantially vertical well formed through a petroleum-containing formation, said formation having an initial low potential for fluid injectivity, a casing string having a production opening near its lower portion positioned in said vertical well, a production flow line in said vertical well extending from a position adjacent said production opening to the earth's surface, packing means packing off the space between the interior of said casing string and the exterior of said production flow line above said production opening, a tubular member in said vertical well between the interior of said casing string and the exterior of said production flow line, said tubular member extending from the earth's surface to a position above said packing means to form a closed-loop flow path from the earth's surface to said packoff means and back to the earth's surface, hot fluid generating means connected to said closed-loop flow path for circulation of hot fluid therethrough to heat viscous petroleum in said formation adjacent at least a portion of said vertical well to provide a potential flow path for fluid in said formation, a second well penetrating said formation closely spaced apart from said vertical well and in communication with said potential flow path for fluid in said formation, and means for injecting a drive fluid through said second well



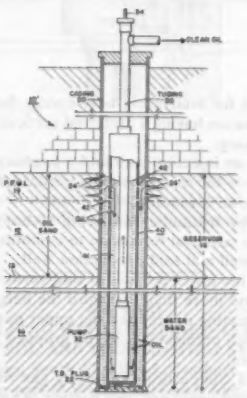
into the upper portion of said formation into said potential flow path for fluid in said formation to promote flow of petroleum to the production opening near the lower portion of said casing string of said vertical well.

4,019,576

OIL RECOVERY FROM AN OIL-WATER WELL

William C. Finch, Houston, Tex., assignor to William C. Finch and Michael P. Breston, both of Houston, Tex., part interest to each

Filed Nov. 23, 1973, Ser. No. 418,482
Int. Cl.² E21B *43/12, 47/04*
U.S. Cl. 166—250 **2 Claims**



1. In a method for the production of a hydrocarbon fluid from an underground formation which is penetrated by a cased well, said hydro-carbon fluid being in contact with water in said formation, said water tending to form a cone and be produced with said hydrocarbon fluid when said well is placed on production, the improvement comprising the steps of:

determining the potential free water level in said well by

measuring the height of the hydrocarbon column in said well and multiplying said height by the specific gravity of the hydrocarbon;

withdrawing said hydrocarbon fluid from said well in a noncommingled condition with said water;

producing into said well by gravity said hydrocarbon fluid through spaced perforated intervals in the casing of said well from spaced producing intervals in said formation, said intervals all being substantially above said determined potential free water level; and

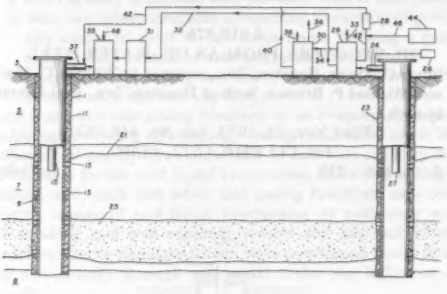
the casing of said well forming a closed-bottom reservoir extending substantially below the level of the oil-water interface.

4,019,577

THERMAL ENERGY PRODUCTION BY IN SITU COMBUSTION OF COAL

John L. Fitch, Dallas, and Malcolm K. Strubhar, Irving, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,079
Int. Cl.² E21B *43/24*
U.S. Cl. 166—259 **12 Claims**



1. A method for recovering heat energy from a subterranean coal formation having a preferred vertical fracture orientation, comprising:

a. providing an injection well and a production well which extend from the surface of the earth and communicate with said coal formation;

b. forming by hydraulic fracturing techniques a vertical fracture in said coal formation to communicate with said injection well and said production well;

c. propping the lower portion of said vertical fracture to a height of no more than one-third the height of said fracture and leaving unpropped the upper portion thereof to provide high permeability in the propped portion only of the fracture;

d. injecting a combustion-supporting gas via said injection well into said lower propped portion of said vertical fracture;

e. igniting said coal to form a combustion zone about said lower propped portion of said vertical fracture and to generate hot combustion gases;

f. continuing to inject said combustion-supporting gas to propagate said combustion zone through said formation along the propped portion of the fracture; and

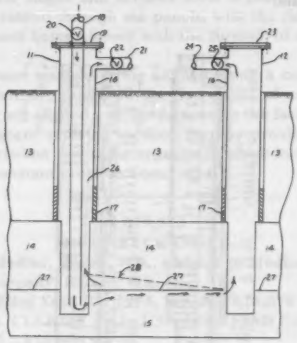
g. producing said hot combustion gases into said production well to recover the heat energy contained thereby.

4,019,578

RECOVERY OF PETROLEUM FROM TAR AND HEAVY OIL SANDS

Ruel C. Terry, 3090 S. High St., Denver, Colo. 80210, and Xerxes T. Stoddard, 4617 W. 27th Ave., Denver, Colo. 80212

Filed Mar. 29, 1976, Ser. No. 671,259
Int. Cl.² E21B *43/24, 43/26*
U.S. Cl. 166—267 **8 Claims**



1. A method of mobilizing and producing normally immobile hydrocarbons from an underground location, comprising the steps of

establishing a first passage between a surface location and a underground deposit of carbonaceous material that is capable of becoming liquid upon application of heat, said first passage containing a fluid injection and a fluid withdrawal means,

establishing a second passage between a surface location and the said underground deposit, the second passage being spaced apart from the said first passage,

establishing a subsurface communication third passage between the the first passage and the second passage,

passing a fluid having a temperature above the pour point temperature of the said carbonaceous material through the said subsurface communication third passage between the first passage and the second passage, said fluid being under a pressure greater than the hydrostatic head pressure, thereby establishing a flow of heat from the injection means in the first passage through the subsurface communication third passage and through the second passage,

transferring heat from the circulating fluid to the said carbonaceous material until the temperature of the said carbonaceous material is at least as much as the pour point temperature of the said material, and

removing the fluid along with the liquid carbonaceous material through the fluid withdrawal means in the first passage and through the second passage.

4,019,579

APPARATUS FOR RUNNING, SETTING AND TESTING A COMPRESSION-TYPE WELL PACKOFF

Erik Thuse, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Continuation of Ser. No. 574,177, May 2, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,382
Int. Cl.² E21B *23/00, 43/10*
U.S. Cl. 166—123 **11 Claims**

1. A well tool for running and setting a pressure-holding well device within an outer well element, comprising

a. an annular body,

b. means for connecting the body to a well pipe for running the well tool into a well,

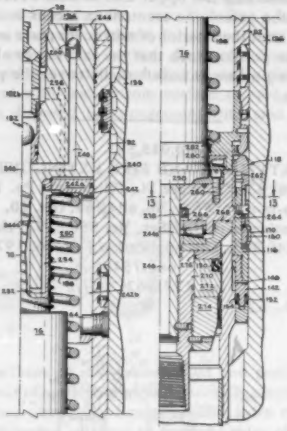
c. fluid piston means disposed within the body for linear

movement therein in response to fluid pressure entering said body from the well pipe,

d. screw means in said body and connected to said fluid piston means for linear movement with said piston means,

e. helical nut means supported in said body for rotation in response to linear movement of the screw means, and

f. means connected to the helical nut means to transmit



rotary movement of said helical nut means to a pressure-holding well device when said well tool and said well device are interconnected, whereby the pressure-holding well device can be run into a well on the well pipe and then set into fluid pressure-tight condition in the outer well element by hydraulic fluid conducted through the well pipe to the well tool, without rotation of said well pipe.

4,019,580

APPARATUS AND METHOD FOR RUNNING, SETTING AND TESTING A COMPRESSION-TYPE WELL PACKOFF

Michael R. Garrett, Houston, Tex., assignor to FMC Corporation, San Jose, Calif.

Continuation of Ser. No. 574,145, May 2, 1975, abandoned. This application Jan. 19, 1976, Ser. No. 650,101

Int. Cl.² E21B *23/04, 23/06*

U.S. Cl. 166—315 **22 Claims**

17. In a well tool for running and actuating a well device within an outer well element, said well tool including a body and means for connecting the body to a pipe for running the well tool into a well, the improvement comprising

a. fluid piston means disposed within the body for linear movement therein,

b. means for conducting hydraulic fluid to said piston means to cause linear movement thereof,

c. means within said body and connected to the piston means to convert the linear movement of said piston means into torque,

d. means connected to the linear movement conversion means to transmit said torque to a well device when said well tool and said well device are interconnected, and

e. means for shifting the axial load of said well tool from said well device onto a well element,

whereby the well device can be run into a well on the well pipe, actuated by hydraulic fluid conducted to the well tool, and the axial load of the well tool shifted from the well device to a well element, without rotation of said well pipe.

22. A method for running and actuating a well device comprising,

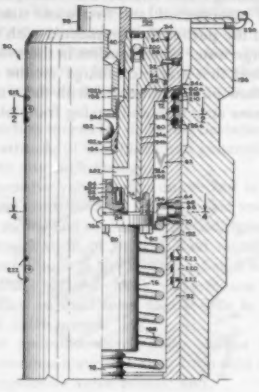
a. running the well device and a well tool as an assembly into a well,

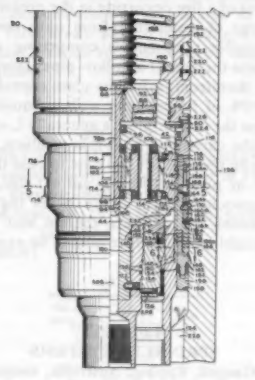
b. landing the well device in the well,

c. effecting linear movement of a piston within the well tool in response to fluid pressure.

d. converting the linear movement of said piston into torque,

e. transmitting the torque to the well device to actuate said well device, and





f. shifting the axial load of the well tool from the well device onto a well element, whereby said well device can be tested under conditions simulating those encountered in normal service.

4,019,581

METAL BUILDING WITH COMBINED TEMPERATURE CONTROL AND FIREFIGHTING SYSTEM

Richard E. Diggs, South 12A Road, Carthage, Mo. 64836

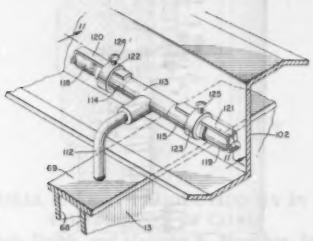
Continuation-in-part of Ser. No. 604,663, Aug. 14, 1975. This application Dec. 18, 1975, Ser. No. 641,906

Int. Cl.² A62C *37/14*

U.S. Cl. 169—16 **7 Claims**

1. Combined temperature control and firefighting system for a metal building having side walls and a roof, and wherein the building includes a metal frame structure supporting the walls and roof, said frame structure having hollow members defining water flow passages for circulation of water throughout the building structure to regulate the temperature of the

building dependent upon the temperature of the circulated water, flow control means in the flow passages, heat responsive means positioned in the building for sensing the presence of a fire and the like in the building and connected with the flow control means to operate the flow control means in the event of a fire in the building to effect circulation of water through the hollow members to maintain them cool and prevent destruction thereof by the temperature associated with the fire, said building frame structure including roof purlins on which the roof is supported, and first water discharge means associated with the purlins and connected with the flow passages to discharge water on the purlins in the event of a fire in the building, said first water discharge means comprising a plurality of hollow pipes connected with the water flow passages in the frame structure and having frangible plug means



associated therewith for precluding the flow of water therethrough during normal operation, said plug means being broken in the event of a fire occurring in the proximity thereof to enable discharge of water therefrom onto the roof purlins, each said frangible plug means comprising a rubber plug snugly fitted into the end of a hollow pipe, closing the pipe to flow of water therefrom, a hollow glass capsule filled to approximately 90% of its capacity with a liquid material and engaged against the rubber plug, a generally L-shaped bracket engaged with the capsule to hold it in position, and a circular clip engaged with the bracket and pipe to hold the bracket and plug securely in position during normal use, whereby the temperature associated with a fire heats the liquid in the capsule, increasing the pressure therein and fracturing the capsule, and enabling the rubber plug to be expelled from the pipe.

4,019,582

SPRINKLER SYSTEMS

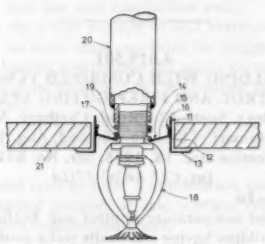
David Bruce Gangell, Epping, Australia, assignor to Environ Mechanical Services Pty. Limited, Sydney, Australia

Filed Nov. 7, 1975, Ser. No. 629,871

Claims priority, application Australia, Dec. 6, 1975, 82079/75

Int. Cl.² A62C *37/08*

U.S. Cl. 169—37 **20 Claims**



7. A sprinkler assembly comprising a sprinkler, a dropper conduit for passing a liquid therethrough, said sprinkler being connected to the outlet end of said dropper conduit, a resilient escutcheon means positioned and maintained between said dropper conduit and said sprinkler, a ceiling means including an aperture therein to permit the passage of said sprinkler and said escutcheon means therethrough and a cover plate inserted into said aperture, said cover plate having a flange on the lower portion thereof and a cross sectional opening smaller than the cross sectional area of said escutcheon means whereupon inserting the upper end of said cover plate past said escutcheon means the escutcheon means is substantially deformed to abut the interior of said cover plate and hold said cover plate in position such that the said flange abuts against the said ceiling means to substantially cover the periphery of said aperture.

4,019,583

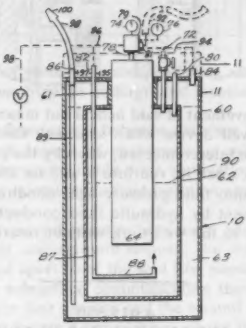
SAFETY TANK AND FIRE EXTINGUISHER

Sidney Simon, 936 Ornmore St., Pittsburgh, Pa. 15201

Continuation-in-part of Ser. No. 624,161, Oct. 20, 1975, which is a continuation-in-part of Ser. No. 550,889, Feb. 19, 1975, Pat. No. D240,903. This application Feb. 26, 1976, Ser. No. 661,754

Int. Cl.² A62C *35/12*

U.S. Cl. 169—62 **14 Claims**



1. A combination gasoline safety tank and fire extinguisher comprising a double walled tank body the inner wall of which forms a container, a manifold removably mounted to said tank body, inlet means mounted to said manifold, outlet means mounted to said manifold, said inlet means and outlet means being interchangeable and adapted to receive and discharge fluid, a conduit connected to said inlet means and extending into the area formed by the inner surface of the container, a pressurized gas source means mounted to said manifold and placed within said container and selectively connected to said inlet means to discharge pressurized inert gas into said container through said conduit so that said inert gas bubbles up through a liquid contained in said container into the top of the container cooling said liquid and pressurizing the liquid in said tank, said double walled tank body forming an outer compartment substantially surrounding said container filled with an incombustible material pressurized by said pressurized gas source, a second conduit located within said outer compartment and discharge means mounted to said tank body adapted to selectively discharge pressurized gas from said gas source, liquid from said container and incombustible material from said outer compartment.

4,019,584

FIRE EXTINGUISHER

Norbert Allmendinger, Willoughby Hills, Ohio, assignor to Richmond Industries, Inc., Willoughby, Ohio

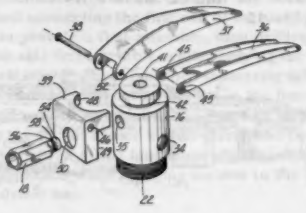
Filed Dec. 1, 1975, Ser. No. 636,522

Int. Cl.² A62C *13/00*

U.S. Cl. 169—74 **11 Claims**

1. A fire extinguisher comprising tank means for holding

fluid under pressure, valve means operable from a closed condition to an open condition to effect a discharge of fluid from said fire extinguisher, said valve means including a valve body connected with one end portion of said tank means, said valve body including surface means defining a groove in said valve body, said groove having a bottom surface and upper and lower side surfaces which extend outwardly from said bottom surface, first handle means for supporting said fire extinguisher, said first handle means including a body portion adapted to be manually engaged during operation of said fire extinguisher and an end portion disposed adjacent to said valve body, said end portion including an end surface disposed in engagement with said bottom surface of said groove and side surfaces disposed in engagement with said upper and



lower side surfaces of said groove, said end portion further including a pair of spaced apart and generally parallel support arms extending outwardly from opposite sides of said end surface and disposed adjacent to opposite sides of said valve body, second handle means for actuating said valve means, said second handle means being connected with outer end portions of said support arms on a side of said valve body opposite from a side of said valve body on which said body portion of said first handle means is disposed, and nozzle means connected with said valve body for directing a flow of fluid upon actuation of said valve means, said nozzle means being disposed on a side of said valve body opposite from the side of said valve body on which said body portion of said first handle means is disposed.

4,019,585

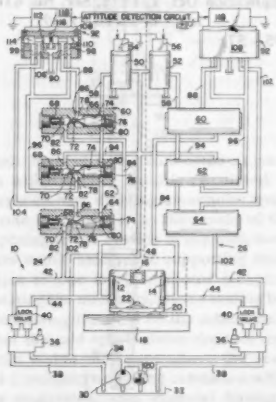
COMBINED AUTOMATIC AND MANUAL HYDRAULIC CONTROL FOR MOTOR GRADER BLADE

Joseph Edward Dezelan, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 427,791, Dec. 26, 1973, abandoned. This application Mar. 17, 1976, Ser. No. 667,737

Int. Cl.² E02F *3/76*; F01B *25/02*, *25/04*

U.S. Cl. 172—4.5 **6 Claims**



4. A combined automatic and manual control system for a motor grader for controlling the angle and vertical position of a grader blade comprising:

a frame member;

a grader blade supported by said frame member for movement relative thereto;

a hydraulic motor for positioning said blade;

a source of pressurized fluid for powering said hydraulic motor;

a manual control valve in continuous uninterrupted communication with said source for directing fluid from said source for operation of said motors;

lock valve means disposed between said manual control valve and said motor for locking said motor in a selected position when said manual control valve is in a neutral position;

attitude detection means for detecting deviations in a predetermined attitude of said blade and generating a signal in response to any such change;

attitude responsive valve means connected in parallel with said manual control valve between said source and said hydraulic motor and responsive to said signal for controlling communication of fluid to said motor for thereby making corrections in the attitude of said work member;

first pilot fluid operated check valve means for normally blocking flow of fluid from said source to said attitude responsive valve means;

second pilot operated check valve means for normally blocking communication of fluid from said motor to said attitude responsive valve means; and,

pilot control valve means connected to said source for simultaneously providing fluid for opening said first and said second pilot operated check valve means for providing open communication of said source to said attitude responsive valve means and for providing open communication of said attitude responsive valve means with said hydraulic motor.

4,019,586

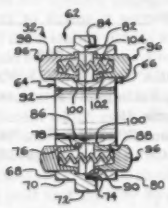
SHIFT DOG FOR TRANSMISSION

Hans Hauser, Fredericktown, Ohio, assignor to The J. B. Foote Foundry Co., Fredericktown, Ohio

Filed Sept. 19, 1975, Ser. No. 614,908

Int. Cl.² F16D *11/10*

U.S. Cl. 192—48.91 **7 Claims**



1. A shift dog for an in-line transmission, said dog comprising a casing of generally cylindrical shape with a generally cylindrical outer wall and two circular end faces, said cylindrical outer wall having a configuration to be engaged by a shifter fork, each of said end faces having at least one opening therein opposite one another and communicating with a larger common cavity within said casing, a projection in each of said openings and having an outer position in which the projection extends outwardly beyond the respective end face and an inner position in which the projection is substantially entirely behind the respective end face, each of said projections having means for preventing movement thereof beyond their outer positions, said cavity having a depth such that the distance between the projections when in their outer positions at least equals the extent to which said projections extend beyond the end faces when in the outer positions, each of said projections having a recess facing toward one another in said common

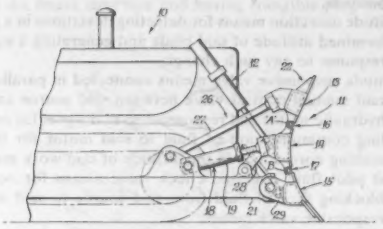
cavity, and resilient means in said cavity with end portions received in said recesses for urging said projections toward their outer positions.

4,019,587

WORK VEHICLE HAVING VARIABLE CURVATURE BLADE ASSEMBLY

Thomas C. Meisel, Jr., Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 17, 1976, Ser. No. 687,054
Int. Cl.² E02F 3/76
U.S. Cl. 172—802 **9 Claims**



1. In a work vehicle having a blade assembly and means connected to the blade assembly for controllably raising and lowering said blade assembly, the improvement comprising:

said blade assembly being formed of at least upper, middle, and lower generally horizontally extending blade portions;

first and second means for pivotally connecting the blade portions one to another for pivotal movement of the upper and lower blade portions relative to the middle blade portion and about first and second generally horizontally extending axes; and

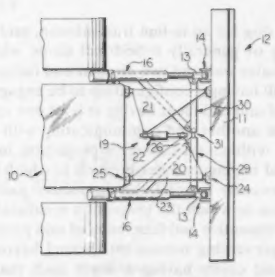
third means for controllably pivoting the blade portions about said first and second axes, said third means including at least one fluid cylinder for controllably moving the pivotal connection of at least one of the blade portions, said fluid cylinder being at a location sufficient for providing said movement with a horizontal direction component.

4,019,588

TILTING MEANS FOR BULLDOZER BLADES

Thomas P. Casey, Burlington, Iowa, assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 30, 1975, Ser. No. 591,662
Int. Cl.² E02F 3/76; A01B 65/00
U.S. Cl. 172—804 **12 Claims**



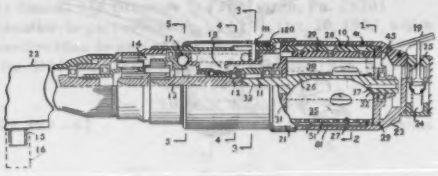
1. In a mounting arrangement interconnected between a unitary work implement and a vehicle, the invention comprising combined support and tilt means, including first and second members each pivotally interconnected between said work implement and said vehicle and extensible and retractable actuating means pivotally interconnected directly between said first and second members for selectively pivoting said members relative to each other to tilt said work implement by alternately raising opposite ends thereof upon alternate extension and retraction of said actuating means.

4,019,589

PULSE MOTOR NUT RUNNER

William K. Wallace, Barneveld, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.

Filed Dec. 2, 1975, Ser. No. 636,911
Int. Cl.² B25B 23/14
U.S. Cl. 173—12 **16 Claims**



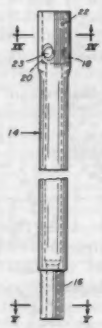
1. A pneumatically powered nut running tool comprising an air driven torque pulse transmitting motor having a rotor operable in a chamber, an air exhaust passage connected for exhausting spent air from the chamber, a valve in the exhaust passage controlling escape of spent air from the chamber having a normally open condition, a spindle connectible with an article to be torqued, a drive train connecting the rotor with the spindle including reduction gearing, clutch means in the drive train adapted to transmit torque pulses from the motor only in a forward direction to the spindle, releasable latch means in the drive train adapted when released to disable the drive train from transmitting further torque pulses to the spindle, and torque responsive cam means connected to the reduction gearing responsive to a predetermined torque overload developing in the reduction gearing to cause closing of the valve and release of the latch means.

4,019,590

METHOD OF ROOF DRILLING

Lloyd B. Hansen, Bridgeport, and Eugene R. Smarrella, Shinnston, both of W. Va., assignors to Carmet Company, Pittsburgh, Pa.

Division of Ser. No. 554,878, March 3, 1975, abandoned. This application Oct. 1, 1975, Ser. No. 618,701
Int. Cl.² E21B 17/00
U.S. Cl. 175—57 **3 Claims**



1. The method of drilling a hole in a mine chamber roof to

a greater depth than the height of the chamber below the roof which comprises providing a starter-driver bar including a first end adapted to be driven by a motor and a second end having a female socket therein, a plurality of rod extensions each having a male end shaped to be received in said female socket and a female socket at its other end of the same cross-sectional size and shape as the first named female socket, and a bit having a male shank of the same cross-sectional shape as said male end; each of said starter-driver bar and rod extensions having an axial hole therethrough, each of said female sockets having a hole through the wall thereof at a distance from the top end of said socket less than the length of the corresponding male end; securing the bit shank in the female socket of said starter-driver with the axial hole in said starter bar in communication with the hole in the socket of said starter bar and connecting the first end of the starter-driver to said motor to provide a first assembly, then drilling a hole in said roof with said first assembly, while applying suction to the bottom of said starter-driver bar, then separating said bit from said starter-driver, then securing the bit in the female socket of a first rod extension and the male end of said first rod extension in the socket of said starter-driver and covering the hole through the wall of the female socket, and then continuing drilling said hole while applying suction to the bottom of said starter-driver bar.

4,019,591

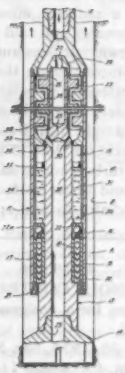
WELL DRILLING TOOL

Fred K. Fox, Houston, Tex., assignor to Engineering Enterprises, Inc., Houston, Tex.

Continuation-in-part of Ser. Nos. 584,964, June 9, 1975, and Ser. No. 546,006, Jan. 31, 1975, Pat. No. 3,971,450. This application Dec. 31, 1975, Ser. No. 645,930

Int. Cl.² E21B *3/12, 41/00*

U.S. Cl. 175—107 **54 Claims**



1. A well tool adapted to be connected as part of a pipe string through which drilling fluid is circulated, comprising inner and outer members defining an annular space therebetween having one end opening to the inside of the tool and another end opening to the outside of the tool, bearing means on the members within said space supporting them for rotation with respect to one another, motor means within said space for so rotating the members, means sealing between said members for separating the fluid on the other side of said tool from that within the said space above the seal means, and a body of material within the space above the sealing means which includes a metallic weighting substance which is liquid during drilling operations, said material having a specific gravity which is sufficiently greater than that of the drilling fluid and being sufficiently insoluble with the drilling fluid, during such drilling operations, that it substantially excludes drilling fluid therefrom.

4,019,592

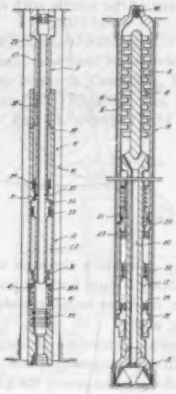
BY-PASS TOOL

Fred K. Fox, Houston, Tex., assignor to Engineering Enterprises, Inc., Houston, Tex.

Filed Dec. 31, 1975, Ser. No. 645,799

Int. Cl.² E21B *17/00, 3/12*

U.S. Cl. 175—234 **5 Claims**



1. A tool for connection as a part of a pipe string which is adapted to be disposed within a well bore, comprising a first tubular member, a second tubular member arranged concentrically within the first member to provide an annular space therebetween, said tubular members being longitudinally reciprocable with respect to one another between extended and retracted positions, first means carried by the second member for sealably engaging the first member, second means carried by the first member for sealably engaging the second member to define a first annular chamber between the first and second sealing means, a first port in the second member connecting the interior of the second member with the first chamber, third means for sealably engaging between the first and second members to define a second annular chamber between the first and third sealing means when said pipe string is lowered to move said tubular members to retracted position, and a second port in the first member connecting the second chamber with the exterior of the tool, said second member having an opening therein which connects the interior of said second member with said second chamber when the pipe string is raised to move said members to extended position, so as to permit drilling fluid to flow through said second chamber and out said second port and thereby by-pass the portion of the pipe string below said tool.

4,019,593

REMOVABLE DRILL BIT NOZZLE

Paul George Craig, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 30, 1976, Ser. No. 654,148

Int. Cl.² E21B *9/08*

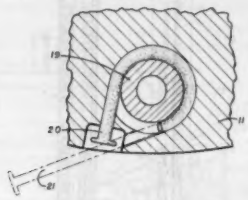
U.S. Cl. 175—340 **1 Claim**

1. In a rotary drill bit including a body having cutting means mounted thereon and a passage for discharging drilling fluid downwardly, the lower portion of the passage having an enlarged bore of circular cross-section providing a downwardly facing shoulder in the passage; a nozzle of hard and brittle material adapted for replacement and having a circular cross-section adapted to be slipped upwardly and without rotation into the enlarged bore of the passage until the upper end of the nozzle is adjacent the shoulder, the improvement comprising:

said body having a first groove therein surrounding the nozzle and intermediate the ends of the nozzle;

said nozzle having a second groove to match the first groove of the body and to therewith form a locking passageway, said first groove and said second groove lying in a common plane;

a retainer member adapted to be deformed into a circular form about the nozzle structure by being forced into the locking passageway formed by the first groove and the matching second groove to bridge between the nozzle and body and lock the nozzle against the body shoulder to prevent movement of the nozzle with respect to the body;



a first passageway extending through said body from the exterior of the body to said locking passageway for allowing said retainer member to be introduced into said locking passageway; and

a second passageway extending through said body at an angle to said first passageway from the exterior of the body to said locking passageway for allowing said retainer member to be forced from said locking passageway, one of said first passageway and second passageway being at an angle to said common plane.

4,019,594

MOTORIZED TWO-WHEELED VEHICLE CONSTRUCTION WITH POWER UNIT SWING SYSTEM

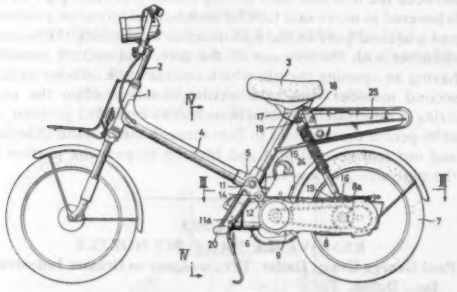
Mikihiro Koyama, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 3, 1975, Ser. No. 610,079

Claims priority, application Japan, Sept. 12, 1974, 49-104357

Int. Cl.² B62K *25/06*

U.S. Cl. 180—33 A **7 Claims**



1. A motorized two-wheeled vehicle construction comprising front and rear wheels, a head pipe connected to the front wheel, a seat structure for a driver, said seat structure having a lower portion, a frame connecting said head pipe and said seat structure, said frame being L-shaped and including at the bend thereof an elbow portion, a power unit including an internal combustion engine and an integral power transmission drive mechanism extending from the engine adjacent one side of the rear wheel for drive thereof, means pivotably connecting said power unit to said frame at said elbow portion, said elbow portion including laterally extending pipe sections, said means which pivotally connects the power unit to the frame comprising depending arms connected to said pipe sections, said power unit being pivotally connected to said depending arms, steps mounted on said depending arms at the lower ends thereof, said depending arms has two branches, one a longer branch extending in continuation of one of the legs of said L-shaped frame and carrying a respective said step at the lower end thereof, the other branch beng a shorter branch pivotally connected to said power unit, and shock absorbing means connecting said power unit to said lower portion of the seat structure.

4,019,595

RADIATOR APPARATUS IN A MOTORIZED TWO-WHEELED VEHICLE

Masahiro Imai, Tokyo, and Satoshi Ishikawa, Kamifukuoka, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 29, 1975, Ser. No. 609,058

Claims priority, application Japan, Sept. 4, 1974, 49-105600[U]

Int. Cl.² B62D *63/04, 61/02*

U.S. Cl. 180—33 R **2 Claims**

1. A motorized two-wheel vehicle comprising a vehicle body with spaced left and right front frame elements, upper and lower cross pipes between said frame elements defining a rectangular aperture, a radiator mounted in said aperture between said frame elements and said cross pipes, said radiator having upper and lower surfaces and side surfaces, left and right air guide plates mounted on the side surfaces of said radiator and being coextensive in height therewith, said guide plates projecting obliquely forwardly and outwards said radiator to cover the left and right front frame elements at the front surfaces thereof to direct air flow to said radiator while preventing generation of turbulence at said frame elements, and means on the upper and lower surfaces of said radiator directly securing said radiator to said cross pipes.

4,019,596

SYNCHRONOUS CONTROL SYSTEM

Stanley W. Crull, Ames, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.

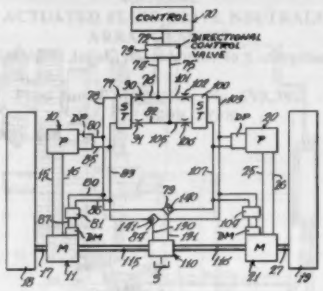
Filed Dec. 30, 1975, Ser. No. 645,391

Int. Cl.² B62D *11/06*

U.S. Cl. 180—6.48 **19 Claims**

1. A synchronous control system for a pair of hydrostatic transmission with each of the latter having a pressure-responsive displacement control for one of the pump or motor of each hydrostatic transmission for controlling the output speed of the transmission, means for establishing a control pressure, and means including a pair of pressure lines with flow restrictors extended fron said control pressure establishing means and one to each displacement control for applying the control pressure to the displacement controls, said system comprising: a rotary valve with a pair of relatively rotatable valve members; means for rotating one of said valve members at a speed proportional to the output speed of one transmission; means for rotating the other of said valve members at a speed proportional to the output speed of the other transmission; said rotary valve having an outlet connected to a sump and a pair of inlets connected one to each of said pressure lines; and said

valve members each having port means coacting to control the flow communication between said inlets and said sump and with the relation between the port means of the valve members varying corresponding to a difference in the output speeds of the hydrostatic transmissions to modify the control pressure in one of said pressure lines and synchronize the speed of the hydrostatic transmissions.

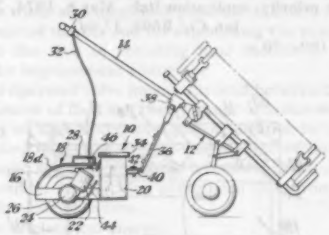


4,019,597

PORTABLE CART-MOUNTED PROPULSION UNIT

James W. Carmichael, Clearwater, Fla., assignor to Haja, Inc., Coral Gables, Fla.

Filed Dec. 31, 1975, Ser. No. 645,830
Int. Cl.² B62D 51/04
U.S. Cl. 180—11 4 Claims



1. A propulsion unit removeably attachable to a conventional manually driven cart comprising:

a rigid, unitary supporting member, said supporting member including a first arcuate end portion, a middle flat portion, and a second end U-shaped portion, said end U-shaped portion sized to receive a storage battery;

first and second rigid side plates, each plate attached on opposite sides of said supporting member, one end of each said side plates attached to the arcuate end of said supporting member and the opposite end of each of said side plates attached to said U-shaped end portion;

a wheel rotatably mounted between and to each of said rigid side plates, said wheel disposed between the first arcuate end portion of said supporting member and the second U-shaped end portion;

an electric motor mounted on the outside of one of said side rigid plates;

a gear drive means connected to said wheel and to said motor mounted on the outside of one of said rigid plates, said motor and gear means mounted on the same rigid plate;

a battery storage container mounted within the U-shaped end supporting member;

a battery disposed within said battery storage receptacle, said battery lying within the plane of said wheel;

means for electrically connecting said battery to said motor;

an electrical switch connected to said means connecting said battery and said motor;

a horizontally disposed bracket attached to said end U-shaped portion of said supporting member and extended outwardly therefrom, said bracket including a flat plate horizontally disposed having an aperture disposed therein;

a movable pin receivable within said aperture; and

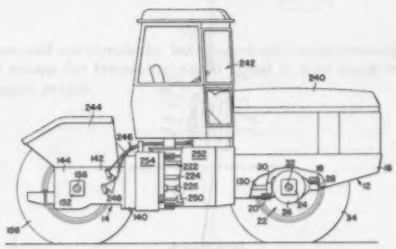
a cart shank attaching bracket pivotally coupleable to said horizontally disposed flange and said movable pin.

4,019,598

ARTICULATED TRACTOR

Karl Heinz Fresmann, and Saul Herscovici, both of Waterloo, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 27, 1975, Ser. No. 544,064
Int. Cl.² B60K 17/34
U.S. Cl. 180—51 7 Claims



1. An articulated tractor comprising: front and rear frame structures pivotally connected for articulation about a generally upright axis; front and rear axle assemblies connected to the front and rear frame structures, respectively, and each including a differential driving a pair of oppositely extending drive axles with a pair of drive wheels connected to and driven by the drive axles on opposite sides of the respective frame structure; an engine mounted on the front frame structure and having a rearwardly extending output shaft; a first speed change transmission section mounted on the front frame structure having an input shaft operatively coupled to the engine output shaft and a rearwardly extending output shaft; a second speed change transmission section mounted on the rear frame structure and having a fore-and-aft extending input shaft and a fore-and-aft extending output shaft with its aft end drivingly connected to the rear differential; a gearbox mounted on the rear frame structure having an upper, forwardly extending, input shaft, an intermediate output shaft parallel to the input shaft drivingly connected to the second transmission section input shaft and coupled to the gearbox input shaft by first gear means, and a lower fore-and-aft extending transfer shaft having its aft end coupled to the fore-end of the second transmission section output shaft; a first driveshaft means coupled between the first transmission section output shaft and the gearbox input shaft and having front and rear universal joints respectively disposed forwardly and rearwardly of the axis of articulation between the front and rear frame structures; a second driveshaft means having one end coupled to the fore-end of the transfer shaft, a second end drivingly coupled to the forward differential, and front and rear universal joints respectively disposed forwardly and rearwardly of the axis of articulation between the front and rear frame structure; a PTO shaft journaled on the front frame structure and having a forward end drivingly coupled to the engine output shaft by second gear means; an intermediate PTO shaft journaled in the gearbox between the gearbox input and transfer shafts; PTO driveshaft means disposed between the first and second driveshaft means and coupled between a forward end of the intermediate PTO shaft and a rearward end of the PTO shaft journaled on the front frame structure and

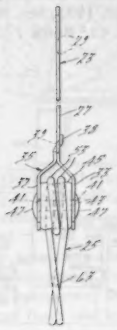
having front and rear universal joints respectively disposed forwardly and rearwardly of the axis of articulation between the front and rear frame structures; and a PTO output shaft journaled in the rear frame structure below the second transmission section output shaft and coupled to the intermediate PTO shaft by third gear means.

4,019,599

SPRING TYPE PIPE SUPPORT

Larry E. Strunk, Jackson, Mich., assignor to Tenneco Inc., Racine, Wis.

Filed Sept. 27, 1973, Ser. No. 401,507
Int. Cl.² F16L *3/02*
U.S. Cl. 180—64 A **9 Claims**



1. A spring type support for a pipe or the like comprising a support post having an axis, a resilient outer layer on the post and coaxial therewith, a spring clamp formed from a single piece of spring wire and shaped to a substantially figure eight configuration consisting essentially of only a first section and a second section, said first section comprising a holding section and being entirely closed and mounted on and around said resilient layer, said second section comprising a pipe clamping section and being open on the portion opposite to the first section to form a pair of resilient jaws and a mouth for the insertion and removal of a pipe, spreading of said jaws causing a reduction in diameter of said first section and compression by said first section of said resilient layer, said jaws being offset in opposite directions with respect to a midplane of the clamp normal to said post axis and intersecting such midplane and extending to opposite sides thereof whereby said jaws crisscross across said midplane and the ends of said jaws will respectively engage opposite sides of a pipe at two points that are separated along the length of the pipe and on opposite sides of said midplane, said crisscross arrangement of said jaws providing means to resist twisting of the clamp off a pipe.

4,019,600

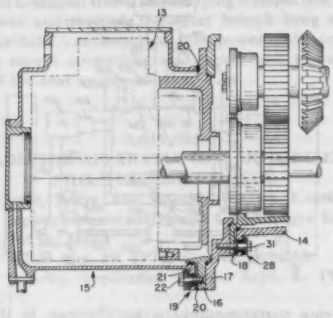
ANTI-NOISE MOUNTING MEANS FOR TRANSMISSIONS

Ralph E. Master, Washington; Arthur J. Ritter, Jr., Metamora, and David L. Perry, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 9, 1975, Ser. No. 584,995
Int. Cl.² B60K *20/00*
U.S. Cl. 180—70 R **1 Claim**

1. In a mobile construction vehicle including a metallic frame, a transmission assembly mounted on said frame and a metallic bell housing mounted on said transmission assembly, the improvement comprising:

an annular flange on said bell housing, an annular flange on said transmission assembly, a plurality of first anti-vibration and noise suppressing means detachably connecting said bell housing flange to said transmission housing flange while preventing metallic contact therebetween, a first support member attached to said transmission assembly flange, a second metallic support member attached to said first support member, an annular flange on said frame, and a plurality of second anti-vibration and noise



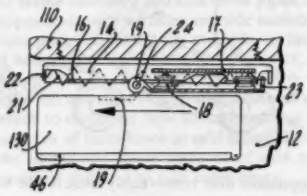
suppressing means detachably connecting said second support member to said metallic frame flange while preventing metallic contact therebetween, each of said first and second anti-vibration and noise suppressing means including elastomeric pad means.

4,019,601

AUTOMATIC CONTAINER-BEARER BAR FOR MOTOR VEHICLES

Italo Di Giovanni, Via Francesco Hayez, 6, 20129 Milan, Italy

Filed Apr. 25, 1975, Ser. No. 572,495
Claims priority, application Italy, May 6, 1974, 22309/74
Int. Cl.² B60K *37/04*
U.S. Cl. 180—90 **10 Claims**



1. A bar for bottles and the like for use in a motor vehicle, said bar comprising:

a. a cabinet container having top and bottom ends and side walls when in a vertical position,

b. elongated guide means adapted to be mounted beneath the dashboard of said vehicle and to extend substantially horizontally from the face of said dashboard towards the front of said vehicle,

c. slide means arranged to slide along the length of said guide means,

d. pivot means for pivotally securing one of said side walls of said container at a position intermediate the top and bottom ends thereof to said slide means,

e. a rack, a sprocket wheel engaging said rack, and a first motor for driving said sprocket wheel to move said slide means horizontally along said guide means, and

f. a worm gear and a second motor for driving said worm gear to pivot said container,

e. whereby said container may be moved from said horizontal storage position horizontally along said guide means towards the rear of said vehicle and then pivotally upwardly to said vertical position such that a portion of said container extends above the plane of said guide means for

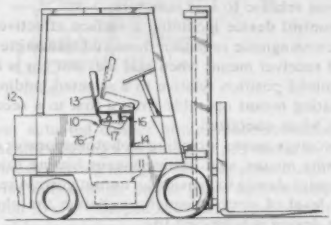
access by an occupant of said vehicle and subsequently may be returned to said storage position when not in use.

4,019,602

SEAT ACTUATED FLUID DRIVE NEUTRALIZING ARRANGEMENT

Cyril W. Habiger, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 7, 1976, Ser. No. 693,392
Int. Cl.² B60K *28/00*
U.S. Cl. 180—101 **7 Claims**



1. In a vehicle of the type having an operator's seat movable between a raised unoccupied position and a lowered occupied position, an engine, a wheel drive line, and a fluid drive arrangement shiftable to forward, neutral and reverse drive conditions and including an overcenter variable displacement fluid pump driven by the engine and a fluid motor drivingly connected to the drive line, an auxiliary source of pressurized fluid, and hydraulic actuator means operatively connected to the fluid pump for establishing the forward and reverse drive conditions when actuating fluid from the auxiliary source of fluid is directed thereto and for establishing the neutral position when the flow of actuating fluid thereto is blocked, wherein the improvement comprises:

solenoid operated valve means disposed between the auxiliary source of fluid and the hydraulic actuator means and having an energized fluid supplying position for directing actuating fluid from the auxiliary source of fluid to the hydraulic actuator means and a de-energized fluid blocking position for blocking pressurized fluid from the hydraulic actuator means;

a source of electrical energy;

a conductor connecting the source of electrical energy to the solenoid operated valve means; and

an electrical switch disposed within the cnductor and having a closed position for completing an electrical circuit to energize the solenoid operated valve means and an open position for de-energizing the solenoid valve, the electrical switch being disposed beneath the operator's seat in a position to be engaged by the seat and actuated to its closed position when the seat is moved to the lowered occupied position and is actuated to its open position when the seat is moved to the raised unoccupied position.

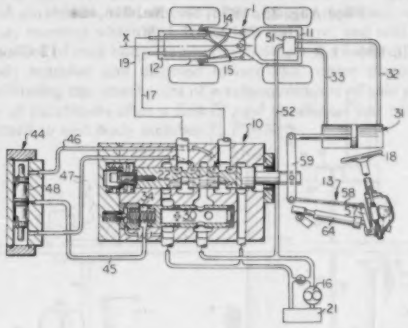
4,019,603

UNDERSTEER VEHICLE STEERING SYSTEM

Dale H. Unruh, Peoria, Ill., and Jan B. Yates, Reynoldsburg, Ohio, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 24, 1975, Ser. No. 644,369
Int. Cl.² B62D *5/06*
U.S. Cl. 180—134 **10 Claims**

1. In an articulated wheeled vehicle having an operator actuated steering system a steering control assembly for producing an understeer steering characteristic in said vehicle, said control assembly comprising; accelerometer means mounted on said vehicle proximate an axle and the dynamic roll axis thereof for sensing lateral acceleration of said vehicle and for producing a signal in proportion thereto, compensating actuator means for automatically modifying the operator actuated steering of said vehicle solely in response to a signal from said accelerometer means, communication means between said accelerometer means and said compensating actuator means for transmitting said signal to said compensating actuator means.

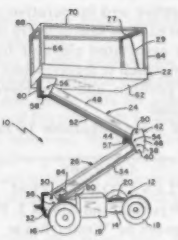


4,019,604

ELEVATING PLATFORM APPARATUS

Lyman David Benson, Santa Rosa, Calif., assignor to Fabtek, Inc., Healdsburg, Calif.

Filed June 16, 1975, Ser. No. 587,354
Int. Cl.² B66F *11/04*
U.S. Cl. 182—2 **4 Claims**

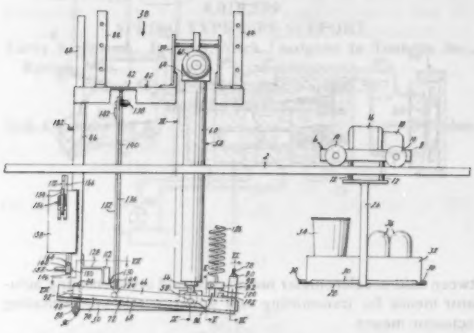


1. In an aerial lift apparatus having a main support frame, the combination of a first parallelogram boom assembly including a pair of elongate parallel first arms mounted at their proximal ends on the support frame and extending at an upwardly inclined angle from the support frame, a floating frame pivotally mounted on the distal ends of the first arms, at least a second parallelogram boom assembly including a pair of elongate parallel second arms pivotally mounted at their proximal ends on the floating frame adjacent said pivotal mounting between the first arms and floating frame, said second arms extending at an angle which inclines upwardly from said base in a direction opposite said inclined angle of the first arms, an end frame pivotally mounted on the distal ends of the second arms, rigid tension link means interconnected between the distal end of one of the first arms and a proximal end of one of the second arms for applying a moment force on the latter to pivot the second boom assembly in an angular direction about the floating frame which is opposite to the angular direction of pivoting of the first arms relative to the main support frame, and means for pivoting the first arms relative to the main support frame.

4,019,605
FOOD DELIVERY SYSTEM FOR RESTAURANTS

Frederic F. Kropf, 2419 N. 72nd Place, Kansas City, Kans. 66109

Filed Aug. 23, 1976, Ser. No. 716,466
Int. Cl.² E04H 3/04
U.S. Cl. 186—1 R 12 Claims

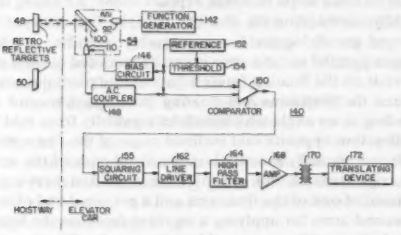


1. A food delivery system for restaurants comprising:
a. a horizontal elevated conveyor track,
b. a carriage operable to move along said track from a central station successively past a plurality of delivery stations spaced along said track, and operable to carry a food container,
c. an elevator tray disposed at each of said delivery stations,
d. a trip member at each of said delivery stations and operable when set in an operative position to transfer said food container from said carriage to the associated elevator tray as said carriage moves past said delivery station, and having an inoperative position in which it does not transfer said food container,
e. trip control means operable to move said trip member between its operative and inoperative positions,
f. elevator means at each of said delivery stations and operable to lower the associated elevator tray from a normal raised position in which it receives said food container to a lower delivery position, and to re-elevate it to its normal raised position, and
g. elevator control means operable to raise or lower said elevator means.

4,019,606
ELEVATOR SYSTEM

William R. Caputo, Wyckoff, and Albert J. Pisatowski, Wayne, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 21, 1975, Ser. No. 560,460
Int. Cl.² B66B 1/40
U.S. Cl. 187—29 R 7 Claims

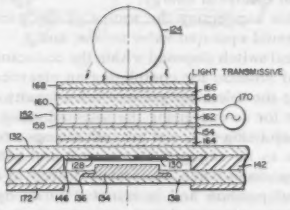


1. An elevator system, comprising:
a structure having a plurality of landings,
an elevator car mounted for movement relative to said structure to serve at least certain of the landings,
transmitter means providing electromagnetic radiation having a predetermined wavelength, with the electromagnetic radiation being pulsed at a predetermined rate,
receiver means responsive to electromagnetic radiation of the wavelength provided by said transmitter means,
a housing,
beam splitter means,
said transmitter means, receiver means, and beam splitter means being mounted within said housing with predetermined orientations,
a control device,
said housing and control device being mounted to provide relative motion between them when said elevator car moves relative to said structure,
said control device including a surface effective to reflect electromagnetic radiation from said transmitter means to said receiver means when said elevator car is in a predetermined position relative to a selected landing,
translating means operable from a first to a second condition when energized,
said receiver means including a photoresponsive device and biasing means, said biasing means biasing said photoresponsive device to provide an output current regardless of the level of electromagnetic radiation the photoresponsive device is subjected to,
said photoresponsive device changing the magnitude of its output current when subjected to electromagnetic radiation,
and means responsive to the changes in the output current of said photoresponsive device, said means energizing said translating means when such changes occur at a rate within a predetermined range which includes the rate at which the electromagnetic radiation provided by said transmitter means is pulsed.

4,019,607
SIGNAL INPUT DEVICES AND SYSTEMS

Alan F. Mandel, Pittsburgh, and Leonard C. Vercellotti, Verona, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 16, 1975, Ser. No. 578,302
Int. Cl.² B66B 3/00
U.S. Cl. 187—29 R 46 Claims

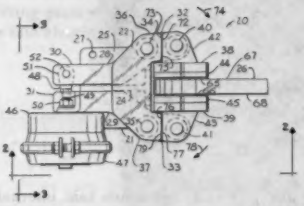


1. A signal input device, comprising:
a switch having first and second opposed sides,
a light source adapted for continuous energization,
an electro-optic light valve disposed between said light source and the second side of said switch, said electro-optic light valve being operable between first and second conditions, with one of the conditions being a light transmitting condition and the other a light blocking condition,
and detector means responsive to actuation of said switch for operating said electro-optic light valve from the first to the second condition,
said switch being constructed to enable light from said light source to be visible on the first side of the switch when said electro-optic light valve is in the light transmitting condition.

4,019,608
LEVER ACTUATED CALIPER BRAKE

Norman Allen Johnson, 5325 Tenth Ave., South Delta, B. C., Canada

Filed May 5, 1975, Ser. No. 574,609
Int. Cl.² F16D 55/224
U.S. Cl. 188—59 6 Claims

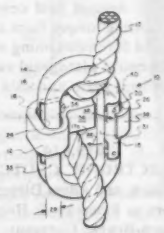


1. A lever actuated caliper brake, in combination with a clamped member having a pair of clamped surfaces, comprising a base means having integral base lug means, said base lug means having only a single planar guide surface substantially perpendicular to said clamped surfaces of said clamped member, a pair of lever means each having an actuated end and an actuating end, each of said lever means pivotally mounted in said base lug means intermediate said actuated and actuating ends, a pair of brake shoe means each having a braking surface on one side thereof and integral shoe lug means extending outwardly from the other side thereof, said shoe lug means having only a single planar guide surface substantially perpendicular to said clamped surfaces of said clamped member and said guide surface of said shoe lug means being in abutting relation to said guide surface of said base lug means, said actuating end of each of said pair of lever means pivotally mounted in said shoe lug means of one of said pair of brake shoe means, said shoe lug means and said base lug means guide surfaces being in slidable opposed ralation, actuator means operatively interconnected to said actuated ends of said pair of lever means, whereby actuation of said actuator means causes said brake shoe means to move toward each other and slidable contact between said guide surfaces of said shoe lug means and said base lug means maintains each of said braking surfaces in substantially parallel relation with one of said pair of clamped surfaces.

4,019,609
BRAKE APPARATUS FOR USE IN RAPPELLING

Kelly B. Wagner, 14510 SE. Woodland Way, Milwaukie, Oreg. 97222

Filed Nov. 3, 1975, Ser. No. 628,068
Int. Cl.² B65H 59/14
U.S. Cl. 188—65.4 5 Claims

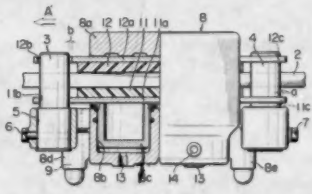


1. A braking apparatus for use in rappelling, comprising an elongate brake bar body member defining a pair of apertures extending respectively through each end thereof in a direction substantially perpendicular to the longitudinal axis of said body member, each said aperture having two open ends, and a plurality of carabiners removably attached to said body member adjacent one another so that a portion of the loop of each carabiner is disposed within each said aperture, said body member including a slot formed therein extending between the two open ends of one said aperture for receiving said carabiners, said slot defining a gap in a portion of said body member which forms said one aperture, and said other aperture of said body member including a jog formed in said body member and directed toward the center thereof for facilitating the attachment of a subsequent one of said plurality of carabiners after a first of said carabiners has been attached to said body member.

4,019,610
FLOATING CALIPER DISC BRAKE

Hiroshi Hirai, Satte, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed July 15, 1975, Ser. No. 595,996
Int. Cl.² F16D 55/224
U.S. Cl. 188—73.3 4 Claims

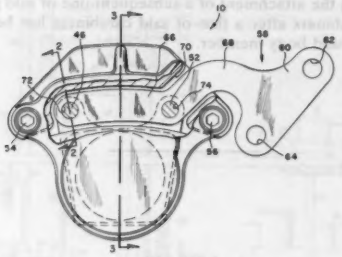


1. A floating caliper disc brake comprising:
a. a rotatable brake disc;
b. a support being located only on one side of said disc and fixed to a stationary vehicle element;
c. two friction pad guide pins for respectively positioning each of a pair of friction pads in such a manner that said pads can be removed by withdrawing said guide pin means, said guide pin means being releasably secured to said support and extended towards said disc and in parallel with a rotational axis of said disc beyond the periphery of said disc;
d. two caliper guide pins other than said two friction pad guide pins being secured to said support and extended towards the opposite direction to said disc and in parallel with the rotational axis of said disc;
e. said pair of friction pads being disposed on the opposed sides of said disc and provided with openings on the side portions of a backing plate associated with each of said friction pads so that said openings of each of said friction pads slidably receive respectively one of said friction pad guide pins in such a manner that the pair of said friction pad guide pins absorb the braking torque generated on said friction pads during braking and the pair of said friction pads can be removed in a circumferential direction by removing said friction pad guide pins without dismounting said caliper and a wheel; and
f. a caliper having an operating means which engages one of said friction pads with a surface of said disc and a reacting portion which engages another one of said friction pads with another surface of said disc due to the reaction of said operating means, and said caliper being positioned between said friction pad guide pins and guided in the direction of the rotational axis of said disc by means of said caliper guide pins.

4,019,611
DISC BRAKE

Irving R. Ritsema, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Mar. 15, 1976, Ser. No. 666,833
Int. Cl.² F16D 55/224; B62L 1/00
U.S. Cl. 188—73.3 4 Claims



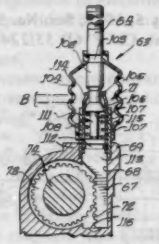
1. In a disc brake for a vehicle:
a rotor mounted for rotation with a member to be braked and having a pair of opposed friction faces;
a pair of friction elements carried adjacent said friction faces and adapted frictionally engage said opposed friction faces when a brake application is effected;
a torque member secured to a non-rotative portion of the vehicle;
a pair of pins carried by said torque member and restrained against relative movement with respect thereto, said pins being circumferentially spaced and extending axially with respect to said rotor, said friction elements having apertures for slidably mounting said friction elements on said pins;
a caliper carried by said torque member, said caliper having a pair of inwardly extending portions disposed adjacent said friction elements for urging the latter into braking engagement with their corresponding friction faces, said caliper further including a bridge portion traversing the periphery of said rotor and interconnecting said inwardly extending portions, and fluid motor means carried by the caliper for effecting a brake application;
each of said inwardly extending portions defining corresponding bores therein located radially outwardly of said periphery of the rotor, the bores in one of said inwardly extending portions registering with corresponding bores in the other portion, said registering bores receiving opposite ends of said pins, said pins extending through the apertures on said friction elements and into the registering bores on said caliper for slidably mounting the friction elements and the caliper on said pins.

4,019,612
AUTOMATIC SLACK ADJUSTER WITH INTERNAL REFERENCE POINT

George P. Mathews, Birmingham, and Thaddeus Lech, Jr., Roseville, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed July 14, 1976, Ser. No. 705,378
Int. Cl.² F16D 65/56
U.S. Cl. 188—196 BA 39 Claims

1. In a slack adjusting mechanism usable in lever actuating systems including an actuatable rotatable lever connected to and rockable about the axis of rotation of a cam shaft for actuation of the system, linkage means operatively connected to a load-biased wormshaft and coupling to provide a fixed reference point internal to the adjuster cooperating with a variably located external pivot point, including a rack, an actuating rod and lost-motion means, such that when the external pivot point is at a fully released position, said rod

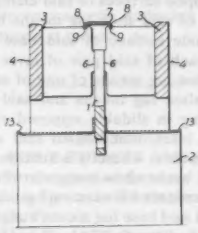


abuts said rack and said rack abuts said internal reference point, and adjustment is terminated.

4,019,613
DISCS FOR DISC BRAKES

Anthony William Harrison, Birmingham, England, assignor to Girling Limited, Birmingham, England

Filed Sept. 23, 1975, Ser. No. 615,893
Claims priority, application United Kingdom, Oct. 2, 1974, 42701/74
Int. Cl.² F16D 65/12
U.S. Cl. 188—218 XL 14 Claims



1. A disc for a disc brake comprising a central plate adapted to be mounted on a rotatable part, two separate braking portions located one on each side of said central plate and each comprising a continuous annulus having an outer side and an inner side, said outer side providing a radial braking surface and said inner side having angularly spaced axially extending vanes of which the free ends abut said central plate, clamping means for holding said free ends of said vanes against and in engagement with said central plate, said clamping means having a certain amount of resilience for resiliently urging said braking portions tightly against said central plate, and coupling means for transmitting torque from said braking portions to said central plate and for maintaining said braking portions concentric with said central plate, said coupling means being separate from said central plate and said braking portions.

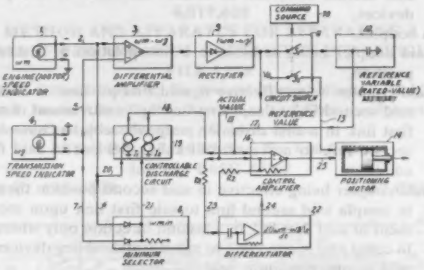
4,019,614
VEHICLE ELECTRONIC CLUTCH CONTROL

Karl Prenzel, Nuremberg, and Adam Dittner, Hochstadt, both of Germany, assignors to Frieseke & Hoepfner GmbH Erlangen-Bruck, Erlangen-Bruck, Germany

Filed Dec. 1, 1975, Ser. No. 636,661
Claims priority, application Germany, Nov. 29, 1974, 2456509
Int. Cl.² F16D 43/284
U.S. Cl. 192—103 F 3 Claims

2. An apparatus for controlling the clutch between an engine and transmission of a vehicle during shifting of gears in

the transmission, comprising, electrical means coupled to the engine and transmission for forming a difference signal corresponding to the difference between the engine speed and the transmission speed and for forming a minimum signal corresponding to the minimum of the engine speed and transmission speed, memory means responsive to disengagement of the clutch and coupled to the electrical means storing the difference signal in a memory as a reference variable in response to start of shifting gears until the gears are shifted, delay means coupled to said electrical means and said memory means and



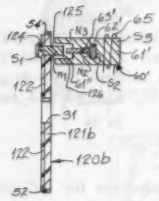
responsive to completion of shifting of the gears for delaying reengagement of the clutch in response to the then occurring difference signal and the reference variable until a predetermined relationship exists between the difference signal and reference variable, varying means coupled to said electrical means and said memory means for varying the reference variable in response to the engine speed and the minimum signal and varying the then occurring difference signal in response to an auxiliary signal including the time rate of change of the difference signal.

4,019,615

LOW INERTIA IMPACT PRINTING MEANS

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Division of Ser. No. 578,216, May 16, 1975, Pat. No. 3,985,218. This application July 26, 1976, Ser. No. 708,587
Int. Cl.² B41J 1/24
U.S. Cl. 197—53 **7 Claims**



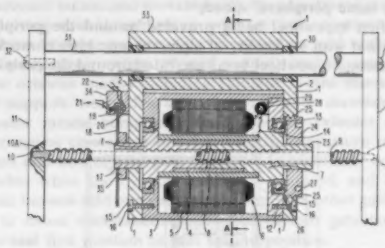
1. A print head comprising the combination:
- a disk of non-magnetic material having apertures through said material orthogonal to the plane of the disk spaced about the disk periphery;
- a plurality of straight radially disposed magnetizable wires embedded in the non-magnetic material; and
- a plurality of elongated permanently magnetized fonts retained by said disk and disposed within said apertures, one of said fonts per one of said apertures, each of the fonts having an axis of elongation which is orthogonal to the plane of the disk, at least some of the fonts having characters integral therewith in a plane substantially parallel to the plane of the disk, said fonts being magnetically held in said apertures by said wires.

4,019,616

LINEAR MOTION DRIVE APPARATUS FOR A PRINTER CARRIAGE

William Duncan Thorne, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 24, 1976, Ser. No. 699,286
Int. Cl.² B41J 19/00
U.S. Cl. 197—90 **1 Claim**



1. Linear motion drive apparatus for a printer carriage or similar mechanism for a business machine, comprising:
- a movably mounted carrier means for carrying an operative printing or similar marking element along a line of action within said machine;
- a threaded screw means fixedly mounted in said machine parallel to, and at least as long as, said line of action to be traversed by said carrier means;
- at least one threaded nut means laterally restrained and mounted for free rotation thereof in said carrier means and threadedly and concentrically engaging said screw means;
- an electric motor having a rotor, a stator and a casing, said rotor, stator and casing being assembled concentrically with one another and with said nut means;
- said rotor being affixed to said nut means to rotate said nut means;
- said motor casing being affixed to said carrier means to prevent rotation of said motor casing;
- said movably mounted carrier means being affixed to a slideable support means for permitting sliding motion of said carrier means in a direction parallel to said screw means; and
- means for applying electricity to said motor to cause it to rotate, thereby rotating said nut and producing linear motion thereof and of said motor and carrier means along said screw means.

4,019,617

PRINTING DEVICE

Gösta R. Englund, Stockholm, and Ernst C-G Lindelöw, Taby, both of Sweden, assignors to Svenska Dataregister AB, Solna, Sweden

Continuation of Ser. No. 439,957, Feb. 5, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 622,937
Claims priority, application Sweden, Feb. 9, 1973, 7301788
Int. Cl.² B41L 47/46
U.S. Cl. 197—133 R **7 Claims**

1. A printing device having at least one printing station for printing on labels in the form of a striplike record medium comprising:
- first and second coaxially mounted rotatable typewheels of substantially the same diameter;
- a rotatable pressure roller associated with each typewheel and arranged in spaced relation to its associated typewheel;
- actuating means for bringing said typewheels and said pressure rollers into engagement for printing upon a label disposed therebetween while advancing said label through said printing station;

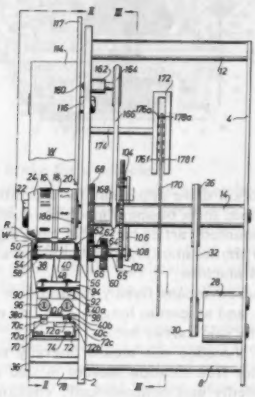
said label being advanced through a distance which is a function of the period of time said typewheels and said pressure rollers are engaged;

said actuating means removing said typewheels and said presure rollers from engagement after completion of a label-printing and label-advancing operation; and

motorized drive means coupled to said typewheels and said pressure rollers and being adapted to continuously rotate said typewheels and said pressure rollers at substantially the same peripheral speed;

said first typewheel being provided around the periphery thereof with a plurality of alphanumeric type characters;

said second typewheel being provided around the periphery



thereof with a plurality of type characters in coded form corresponding to at least certain ones of said alphanumeric characters;

one of said typewheels being provided at the periphery thereof with at least one projection located on said typewheel at a position at which said typewheel is not provided with type characters;

said at least one projection being adapted to contact a label disposed between said typewheel and said pressure rollers; whereby,

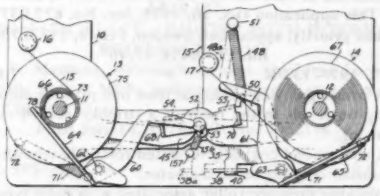
during rotation of said typewheel and said presure rollers, said at least one projection advances said label through a distance which is a function of the period of time said typewheels and said pressure rollers are engaged.

4,019,618

REVERSIBLE RIBBON DRIVE MECHANISM

Richard E. Busch, La Puente, Calif., assignor to Addmaster Corporation, San Gabriel, Calif.

Filed Apr. 8, 1976, Ser. No. 674,814
Int. Cl.² B41J *33/44*
U.S. Cl. 197—161 **13 Claims**



1. In a ribbon mechanism having a pair of spaced ribbon spools,

a ribbon extending between said spools, and

ratchet members connected to said spools for rotation about spaced parallel axes;

reversible feeding mechanism for said ribbon comprising drive pawl devices engageable with respective ones of said ratchet members,

a first link connecting said pawl devices,

means for oscillating said link to actuate said pawl devices to advance said ratchet members,

disabling devices for respective ones of said pawl devices,

a second link connecting said disabling devices to move in unison from a first condition to a second condition,

said disabling devices being effective in said first condition to disable one of said pawl devices and being effective in said second condition to disable the other of said pawl devices,

a coupler,

said coupler being settable in a first position or a second position,

said coupler being effective in said first position to couple said second link to said first link upon movement of said first link in a first direction only whereby to cause said second link to move said disabling devices to said first condition,

said coupler being effective in said second position thereof to couple said second link to said first link upon movement of said first link in a second direction only whereby to cause said second link to move said disabling devices to said second condition, and

sensing means controlled by a ribbon roll on a first one of said spools for moving said coupler into said first position when the diameter of the ribbon roll on said first spool reaches a predetermined diameter,

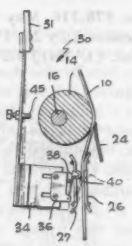
said sensing means being controlled by a ribbon roll on the other of said spools for moving said coupler into said second position when the diameter of the ribbon roll on said other spool reaches a predetermined diameter.

4,019,619

PAPER FEED SENSING MECHANISM FOR PRINTER

Leo J. Emenaker, Playa del Rey, Calif., assignor to Printronix, Inc., Irvine, Calif.

Filed Mar. 22, 1976, Ser. No. 669,245
Int. Cl.² B41J *29/44*
U.S. Cl. 197—189 **7 Claims**



1. A sensing mechanism for indicating the presence or absence of paper movable along a predetermined path and an operative position of a platen movable outwardly relative to the paper from the operative position, comprising:

cantilevered spring arm means having a fixed end and a free end disposed adjacent the paper, an intermediate region of the spring arm means being adjacent the platen, the position of the free end of said spring arm means being responsive to the position of the platen when moved from the operative position; and

switch means coupled to said spring arm means in the vicinity of the free end thereof, said switch means including actuator arm means extending toward the paper path, the displacement distance of the free end of said spring arm means being substantially greater than the travel of said actuator arm means, and the platen holding the actuator

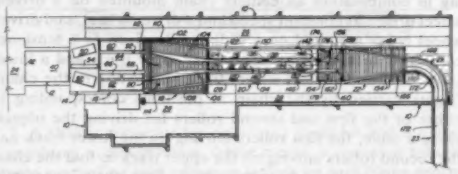
arm means away from the paper path when the platen is not in the operative position and permitting said spring arm means to urge said actuator arm means toward the paper path under spring force when the platen is in the operative position, such that said actuator arm means is automatically displaced from the paper path when the platen is moved out from the operative position but reliably responds to the presence of paper despite aberrations and irregularities in the paper when the platen is in the operative position.

4,019,620

METHOD AND APPARATUS FOR SEPARATING A PALLETIZED ARRAY OF CONTAINERS INTO SINGLE FILE LINE

Robert Leland Frenkel, Englewood; Peter Vischer, Golden, and James Allen Gulka, Arvada, all of Colo., assignors to Coors Container Company, Golden, Colo.

Filed Feb. 23, 1976, Ser. No. 660,722
Int. Cl.² B65G *47/00*
U.S. Cl. 198—399 **37 Claims**



1. A method of separating containers in a generally rectangular array, the array being comprised of a plurality of abutting generally rectangular shaped containers having longitudinal and transverse orientations within the array, comprising:

advancing all the containers of the array generally in a direction generally parallel with the longitudinally oriented containers,

transversely spacing the containers into a first plurality of lines extending generally parallel to the longitudinally oriented containers as the containers are advanced,

turning the containers in the lines with transverse orientations to longitudinal orientations as the containers are advanced , and

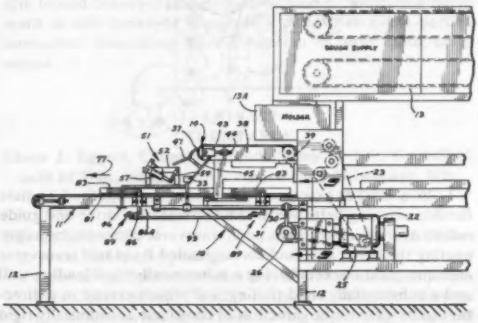
converging the longitudinally oriented containers in a longitudinal offset manner into a single line of single file longitudinally oriented containers.

4,019,621

DOUGH PLACER IMPROVEMENTS

Douglas R. Hanson, 1720-9th Ave. S., Anoka, Minn. 55303

Filed Aug. 4, 1975, Ser. No. 601,352
Int. Cl.² B65G *47/22*
U.S. Cl. 198—432 **10 Claims**



1. In combination with a dough feeding machine having a main frame and including a discharge conveyor for carrying dough pieces and for discharging dough pieces in direction toward a baking pan positionable below the discharge end of the conveyor, and a dough piece orienter means comprising a pair of gate members movable to a first position to receive said dough pieces and position them with respect to a baking pan, and movable to a second position to discharge said dough pieces, and wherein said conveyor includes adjustment means at the discharge end for adjusting the tension of the belt, the improvement comprising support means attached to said adjustment means and movable with the adjustment means for supporting said dough piece orienter with respect to said machine, slidable guide means mounted on said main frame and supporting portion of said support means, said dough piece orienter means including actuator means mounted on said support means for actuating said gate members, said actuator means comprising fluid pressure cylinder means, lever means connected between said fluid pressure cylinder means and one of said gate members to pivot said one gate member when the cylinder means is operated, and linkage means betwen said one gate member and the other gate member to cause simultaneous operation of said gate members from said first position to said second position.

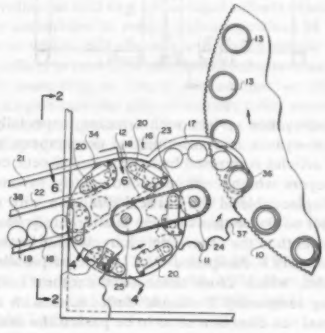
10. In a dough feeding machine including a pan conveyor movable in a first direction, and having a pair of guides, one adjacent each of the sides of said conveyor for guiding said pan in a desired path, said guides each being mounted on opposite sides of said machine with a pair of links pivotally mounted to said guides in spaced relationship therealong, a pair of shafts mounted for substantially upright pivotal movement, said links being fixed to said shafts, and a separate arm member on each of said shafts positioned at an opposite end of said shaft from said links, said arms being fixed to said shaft, a separate connecting link positioned between associated pairs of said arm members, said separate connecting links being substantially parallel to said guides, and separate friction clutch means between each of said separate connecting links and each of its connected arm members to permit individual adjustment of said guides at opposite ends thereof and relative to each other and to retain said guides in adjusted position under frictional force.

4,019,622

DUAL WHEEL DISCHARGE FOR CAN TESTER

Harry Clifford Messervey, East Randolph, N.Y., assignor to Borden, Inc., Columbus, Ohio

Filed Mar. 19, 1976, Ser. No. 668,701
Int. Cl.² B65G *47/32*
U.S. Cl. 198—441 **3 Claims**



1. In a switching mechanism for selectively diverting successive advancing articles, a first wheel having disposed about its periphery a plurality of spaced-apart pockets for engaging and supporting said advancing articles, a fixed member disposed about the periphery of said first wheel for cooperatively engaging and diverting one of said advancing articles and

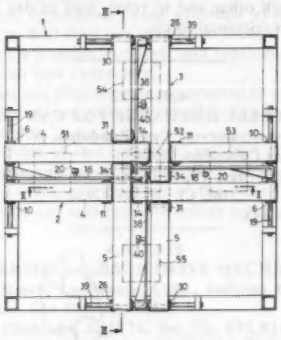
thereby depositing it in a pocket of said first wheel, a double-disc second wheel disposed adjacent to said first wheel so that one disc is on each side of said first wheel and the outer peripheries of the first and second wheel overlap, disposed about the periphery of said second wheel a plurality of equally spaced, two-position, hinged flippers secured to a disc of said second wheel, each of said flippers having a plurality of pins secured to said flipper, said disc having at least one opening therein to allow said pins to protrude into the space between said discs of said second wheel in such a manner as to support an advancing article between said discs when said flipper is in one position and to allow complete removal of said pins from said space between discs when the flipper is in the second position, and a permanent magnet associated with said hinged flipper to hold it in said one position and a second permanent magnet to hold said flipper in said second position.

4,019,623

CONVEYANCE UNIT WITH CROSSING, ESPECIALLY FOR THE CONVEYANCE AND SWITCHING OF NEWSPAPERS, MAGAZINES AND OTHER ARTICLES COMPOSED BY SUPERPOSED SHEETS

Lamberto Tassi; Aris Ballestrazzi, and Gianni Tosarelli, all of Vignola, Italy, assignors to Situno Holding S.A., Luxembourg, Luxembourg

Filed Apr. 5, 1976, Ser. No. 673,548
Claims priority, application Italy, Apr. 3, 1975, 21969/75
Int. Cl.² B65G *47/00*
U.S. Cl. 198—457 **2 Claims**



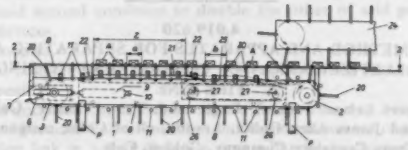
1. A conveyance system with crossing, especially suitable for the conveyance and switching of newspapers, magazines and other articles composed by superposed sheets, comprising two conveyors which cross perpendicularly to one another and are displaceable in the vertical direction with respect to one another so that either of them is alternately positioned at a higher level than the other one, characterized in that each of these conveyors is composed by a couple of parallel and coplanar belts, which cross those of the other couple while undergoing temporary U-shaped deflections with respect to their normal run direction so as to be passed the ones beneath the others, the crossing being so obtained that a first belt of a first couple is passed beneath a first belt of the second couple, the second belt of the first couple is passed beneath the second belt of the second couple, the first belt of the second couple is passed beneath the second belt of the first couple and the second belt of the second couple is passed beneath the first belt of the first couple.

4,019,624

DEVICE FOR INTERMITTENTLY RECEIVING AND CONTINUOUSLY DELIVERING OBJECTS

Jean Torres, Lausanne, Switzerland, assignor to SAPAL Societe Anonyme des Plieuses Automatiques, Switzerland

Filed Oct. 7, 1975, Ser. No. 620,325
Claims priority, application Switzerland, Dec. 19, 1974, 16944/74
Int. Cl.² B65G *47/26*
U.S. Cl. 198—459 **2 Claims**



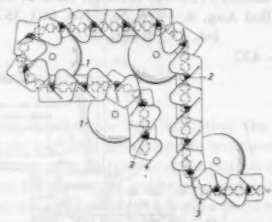
1. A device for continuously delivering to a machine, a series of objects intermittently received, said device comprising in combination an endless chain mounted on a driving wheel driven at constant speed and a driven wheel, said driven wheel being mounted on a sliding yoke fixed to a tensioner constantly tensioning the chain, an upper track and a lower track, first and second rollers fixed alternately to the chain, fingers carried by the chain at positions corresponding to either of the first and second rollers for driving the objects along a table, the first rollers moving on the lower track and the second rollers moving on the upper track to fold the chain in a zig-zag section where the speed of the chain is intermittently reduced or cancelled for receiving the series of objects, a vertically movable track disposed at the end of the zig-zag section at the outlet of the upper track to receive the second rollers leaving said upper track, said vertically movable track being controlled by eccentric means driven in synchronization with the driving wheel to produce a vertical reciprocating movement of the vertically movable track, whereby the fingers may once more move at the same speed as the extended chain and with a uniform output pitch.

4,019,625

BUCKET CONVEYOR

Hans Holger Wiese, Wieloweg 9, 3001 Fuhrberg, Germany

Filed May 19, 1975, Ser. No. 578,590
Claims priority, application Germany, May 24, 1974, 2425036
Int. Cl.² B65G *17/12*
U.S. Cl. 198—708 **4 Claims**



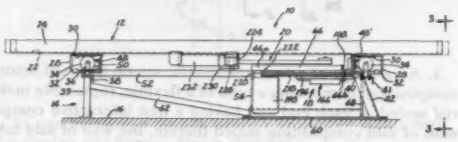
1. In a bucket conveyor comprising two toothed endless flexible carrying belts of elastomeric material, drive and guide rollers over which the belts pass, transverse elements interconnecting the belts, and buckets suspended from said transverse elements, said buckets having a substantially rigid leading wall and a substantially rigid trailing wall which extend in a direction transverse to the direction of travel and substantially rigid side walls connected to said trailing wall, portions of adjacent leading and trailing walls being interlocked at the transverse

element without relative movement therebetween, the improvement comprising a weakened region in each of said leading walls extending across the width thereof adjacent to said transverse elements forming a flexible wall part, said weakened region being below said transverse elements and being free of any connection with said side walls and being connected to the rear wall of the preceding bucket, said weakened region having a reduced cross-section relative to the remainder of said leading wall, thereby permitting flexing of the interlocked buckets.

4,019,626
SHAKER CONVEYOR AND DRIVE MECHANISM THEREFOR

Haim J. Kamner, Palatine, Ill., assignor to Goodman Equipment Corporation, Chicago, Ill.

Filed Feb. 27, 1975, Ser. No. 553,437
Int. Cl.² B65G *25/04*
U.S. Cl. 198—750 **19 Claims**



1. A shaker conveyor for conveying particles and the like, comprising, in combination, frame means, a conveyor trough, means supporting said conveyor trough on said frame means for reciprocating movement of said trough, and drive mechanism means operatively associated with said conveyor trough in a manner to effect said reciprocating movement thereof, said drive mechanism means including housing means defining a first longitudinal axis, input crank means rotatably supported by said housing means for rotation about an axis coincident with said first longitudinal axis, said input crank means having an input crank arm the axis of which is eccentric to said axis of rotation of said input crank means, output crank means rotatably supported by said housing means for rotation about an axis parallel and eccentric to said first longitudinal axis, said output crank means having an output crank arm the axis of which is parallel and eccentric to said axis of rotation of said output crank means, means for effecting rotation of said input crank means at a substantially constant rotational speed, means interconnecting said input crank arm to said output crank means including a cylindrical slide block carried by said input crank arm with the longitudinal axis of said slide block being substantially perpendicular to the longitudinal axis of said input crank arm, said slide block being cooperable with said output crank means in a manner to effect rotation of said output crank means at a predetermined variable angular velocity during each revolution thereof upon rotation of said input crank means, and means connecting said output crank arm to said conveyor trough to effect said reciprocating movement of said conveyor trough in a manner to cause particle movement therealong during rotation of said input crank means.

4,019,627
TURNTABLE

Glenn J. Eggert, Cedarburg, and Phillip L. Lee, Greenfield, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Sept. 12, 1975, Ser. No. 612,972
Int. Cl.² B65G *13/02*
U.S. Cl. 198—786 **2 Claims**

1. A turntable comprising:

a. a plurality of transfer roller assemblies mounted in planar array, each of said transfer roller assemblies comprising:

i. a hollow cylindrical roller having a plurality of spaced apertures in the surface thereof and

ii. a plurality of stub rollers mounted in said hollow cylindrical roller such that their axes of rotation are not parallel to the axis of rotation of said hollow cylindrical roller and a portion of the surface of each of said stub rollers protrudes through a corresponding one of said plurality of spaced apertures in said hollow cylindrical roller;

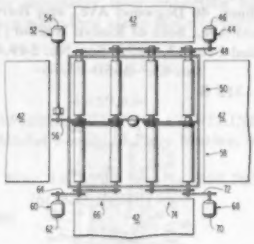
b. first means for rotating said hollow cylindrical rollers in a first subset of adjacent ones of said transfer roller assemblies in a selected direction;

c. scond means for rotating said hollow cylindrical rollers in a second subset of adjacent ones of said transfer roller assemblies in a selected direction, said second subset being axially aligned with the first subset;

d. third means for rotating said stub rollers in said first subset of said transfer roller assemblies in a selected direction;

e. fourth means for rotating said stub rollers in said second subset of said transfer roller assemblies in a selected direction;

f. fifth means for rotating said hollow cylindrical roller in a third subset of adjacent ones of said transfer roller assemblies in a selected direction;



g. sixth means for rotating said hollow cylindrical rollers in a fourth subset of adjacent ones of said transfer roller assemblies in a selected direction, said fourth subset being axially aligned with the third subset;

h. seventh means for rotating said stub rollers in said third subset of said transfer roller assemblies in a selected direction;

i. eighth means for rotating said stub rollers in said fourth subset of said transfer roller assemblies in a selected direction; and

j. ninth means for controlling said first, second, third, fourth, fifth, sixth, seventh, and eighth means so that the directions in which said third and fourth means cause the stub rollers in said first and second subsets of said transfer roller assemblies to rotate are independent of the directions in which said seventh and eighth means cause the stub rollers in said third and fourth subsets of said transfer roller assemblies to rotate and so that an object positioned upon said plurality of transfer roller assemblies can be caused to rotate and/or translate with respect to said plurality of transfer roller assemblies.

4,019,628
DISPOSAL SYSTEM

Robert L. Derby, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

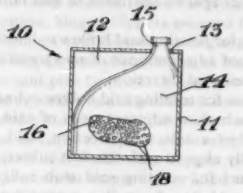
Division of Ser. No. 353,194, April 20, 1973, Pat. No. 3,881,295. This application Oct. 30, 1974, Ser. No. 519,385
Int. Cl.² B65D *81/26*; C09K *3/00*
U.S. Cl. 206—524.4 **6 Claims**

1. A shipping container particularly suited for the disposal of ecologically undesirable polymer swelling chlorinated hydrocarbon liquids, the shipping container comprising

a combustible ecologically undesirable chlorinated hydrocarbon polymer swelling liquid-impermeable hollow body defining

a space therein, disposed within said space

a chlorinated hydrocarbon liquid swellable crosslinked synthetic resinous polymer which swells but does not dissolve in the liquids, the polymer being present in a



quantity sufficient to form a gel when an ecologically undesirable polymer swelling chlorinated hydrocarbon liquid is added to the space.

4,019,629

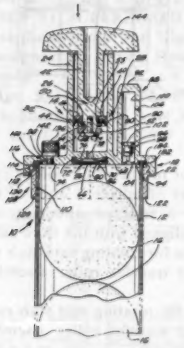
PRESSURIZED TENNIS BALL CONTAINER

Robert B. Dubner, 40 Dogwood Ave., and Harold Bienenfeld, 145 Dogwood Ave., both of Roslyn Harbor, N.Y. 11576

Filed Feb. 13, 1975, Ser. No. 549,473

Int. Cl.² B65D *85/16*

U.S. Cl. 206—315 B **9 Claims**



1. A cover assembly for use with a metal tennis ball can to form a pressurized tennis ball container, comprising a transparent cover member sized to overlie the top of said can and having a integral pump cylinder upstanding therefrom, a pump piston extending into said pump cylinder, piston seal means mounted on said piston including a sealing ring slidably mounted on said piston and providing a wiping seal between said piston and said pump cylinder for preventing the flow of air past said piston on the downstroke of said piston and with said means opening to permit airflow past said piston on the upstroke of said piston to refill said cylinder, valve means disposed to permit the flow of air from said cylinder into said tennis ball can and to prevent the flow of air in the reverse direction, means for mounting said cover member on said tennis ball can, pressure release mounted on said cover member for venting pressure from said tennis ball cans, and pressure indicator means on said cover for indicating the attainment of a selected pressure within the can upon which said cover member is mounted by operation of said pump piston, said pressure indicating means including a transparent cylinder formed integrally with said transparent cover member and upstanding therefrom, said transparent cylinder having a closed top end and an open bottom end communicating with the interior of said can, a piston slidably mounted in said cylinder and visible therethrough, and a reference line on said cylinder at a location to indicate the attainment of said selected pressure within said can when said piston registers with said reference line, said pressure indicator means providing a continuous visual indication of the pressure within said can until said pressure is released by said pressure release means.

4,019,630

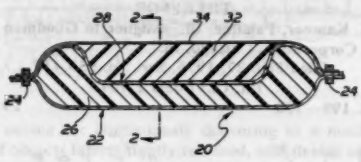
CARTRIDGE CONTAINING A SELF-SETTING COMPOSITION

Anthony Cecil Plaisted, North Royalton, Ohio, assignor to Fosroc A.G., Zug, Switzerland

Filed July 28, 1975, Ser. No. 599,496

Int. Cl.² B65D *25/08, 31/12*

U.S. Cl. 206—219 **4 Claims**



1. A cartridge of a two component, interactive, self-setting composition, comprising a tube of a flexible, ruptura'le material sealed at each end and having a first interactive component of said composition sealed therein, the wall of said tube being depressed inwardly toward the facing wall portion beyond the center of the tube to form a depression in the filled tube, said depression extending substantially toward each end of said tube and being filled with the second interactive component of said composition, said filled depression extending continuously from the outer surface of said tube past the center of said tube, with the portion of said tubing forming said depression serving as a barrier wall precluding the interaction of said components and sealing means sealing said second component within said depression.

4,019,631

SCREW PACKAGE

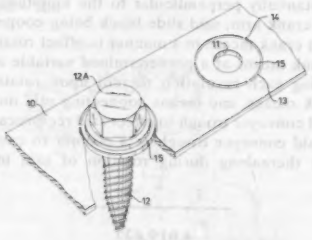
Sixten Harald Lejdegard, Ramnas, and Stig Lennart Björklind, Hallstahammar, both of Sweden, assignors to Bulten-Kanthal Aktiebolag, Sweden

Filed Apr. 18, 1975, Ser. No. 569,398

Claims priority, application Sweden, Apr. 18, 1974, 7405197

Int. Cl.² B65D *85/24, 73/00*

U.S. Cl. 206—347 **4 Claims**



1. A screw package comprising:

a. a carrier strip of flat sheet material having a series of holes;

b. means defining circular lines of weakness in said strip entirely surrounding each of said holes whereby a prospective flat washer is defined in said strip; and

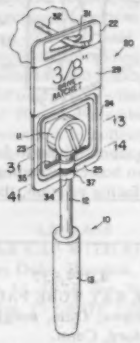
c. a plurality of screws having heads and shanks, said heads having entirely flat undersides disposed against the uppermost surface of said strip, and said shanks extending through said holes and having a snug screw-retaining fit with said strip in said holes.

4,019,632

TOOL HANDLE DISPLAY AND HANGER DEVICE

Hugh T. Greenlee, Gates Mills, Ohio, assignor to The Wright Tool & Forge Co., Barberton, Ohio

Filed May 11, 1976, Ser. No. 685,349
Int. Cl.² B65D *61/00, 85/20*
U.S. Cl. 206—349 **1 Claim**



1. In combination a socket wrench tool drive component and a display and hanger device therefor,

said drive component having an enlarged operating head and a relatively thin elongated stem portion connected to said head, and

said display and hanger device being formed of relatively thin, flat, rigid formable plastic material and having a rectangular opening at its lower portion of sufficient size to permit positioning of said operating head therein said opening being defined by two parallel side portions and a bottom portion, said bottom portion having a semi-cylindrical hump formed therein with an inner diameter corresponding to the diameter of said stem, and

said display and hanger device also having a rectangular strip initially formed contiguous with and generally coplanar with said bottom portion and having a semi-cylindrical hump formed thereon corresponding in size and shape to said hump in said bottom portion,

said rectangular strip being readily removable from said bottom portion and adapted to be secured back-to-back to the rear face of said bottom portion with said humps in reverse relationship to define an annular collar adapted to receive said stem to retain and secure said drive component to said display and hanger device with said operating head in said opening,

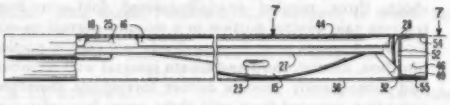
and means defining a hole in said display and hanger device for hanging said device and said drive component on a hook.

4,019,633

CARTONED MEDICAL INSTRUMENT PACKAGE

Nathan Roth, San Francisco, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed July 18, 1975, Ser. No. 597,020
Int. Cl.² B65D *83/10, 5/50*
U.S. Cl. 206—364 **5 Claims**



1. A cartoned medical instrument package comprising in combination:

a. a package comprising:

i. a thermoplastic tray having a cavity for holding the instrument, a convexly curved marginal ledge about the cavity extending outwardly from the opening of the cavity and defining the top surface of the tray, an end wall extending downwardly from each end of the ledge, and a flange extending outwardly from the bottom of each end wall,

ii. a cover for said cavity, and

iii. means for adhesively securing the cover to said ledge about the complete perimeter of the cavity such that the cover may be peeled away to expose the cavity; and

b. a carton adapted to envelop the package completely comprising:

i. a bottom wall against which the bottom of the package rests,

ii. a pair of single piece end walls, each of which is foldably connected to the bottom wall and has an inwardly extending section that overlies one of the flanges of the tray of the package whereby the package is held firmly in place in the carton,

iii. a first flap foldably connected to an opposite edge of the bottom wall, said first and second flaps adapted to fold over the top of the package in overlapping relationship to each other, and

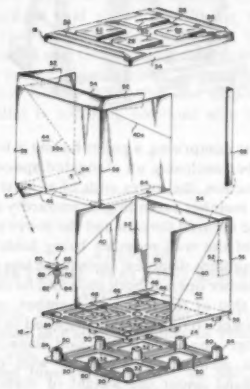
v. means for releasably interconnecting said first and second flaps while they are in said overlapping relationship.

4,019,634

COLLAPSIBLE SHIPPING CONTAINER

Pierre Edmond Michel Bonnot, 3 Place Marine, Maisons-Laffitte, France

Filed Mar. 19, 1975, Ser. No. 560,263
Int. Cl.² B65D *19/00*
U.S. Cl. 206—386 **14 Claims**



1. A collapsible shipping container comprising an upper section and base portions, a pallet for supporting said upper section, and fastener means for attaching said upper section to said pallet, said pallet having openings therein, said base portions having openings therein overlying said openings in said pallet, said fastener means including a flat base, resilient arms extending from said base, said arms extending through the openings in the pallet and through the openings in said base portions, each of said resilient arms carrying a flange pair defining a groove for receiving a portion of said pallet surrounding said openings, one member of said flange pair providing a surface which rests on said portion of said pallet and thereby shares in sustaining the load in said container.

13. A collapsible shipping container comprising, an upper storage section, a pallet for supporting said upper storage

section, and fastening means for attaching said upper storage section to said pallet, said upper storage section including a pair of U-shaped panel sections each having base means which are securable to said pallet by said fastening means, said pair of U-shaped panel means overlapping so as to form four walls of said container, each of said U-shaped panels including a pair of thrust-absorbing tabs which extend partially toward the bottom of said container when in position, said tabs connected by a horizontal panel extending along the upper edge of one side of said container, said tabs transforming at least part of a vertical stacking load into a horizontal component directed toward the sides of said U-shaped panels.

4,019,635

PALLET-CONTAINER FOR TRANSPORTING BULK MATERIAL

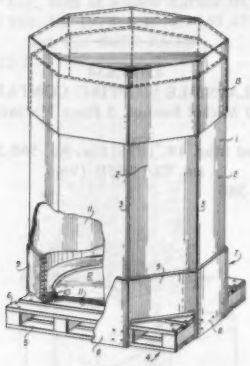
Gerardus Anthonius Maria Boots, Zaandam, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed Nov. 14, 1975, Ser. No. 631,914

Claims priority, application Netherlands, Nov. 14, 1974, 7414833; Apr. 29, 1975, 7505061

Int. Cl.² B65D *19/00*

U.S. Cl. 206—386 **3 Claims**



1. A container comprising a pallet having a top and sides, a first wall member enclosing an elongated space having a polygonal cross-section, the lower ends of at least two segments of the said wall member extending downwardly along the sides of the pallet and secured thereto and the lower ends of at least two segments of the wall member being folded to form inwardly extending flaps disposed against the top of the pallet, a second wall member open at both ends and having a cross-section similar to that of the first wall member, one end of the second wall member being slidably disposed in the first member with its edge disposed on the said flaps and extending above the first member, said second wall member being adapted to expand under the weight of material contained therein and pressed into engagement with the first wall member, whereby the two said members are secured together solely by said expansion of the second member.

4,019,636

STRAND PACKAGE AND CARTON THEREFOR

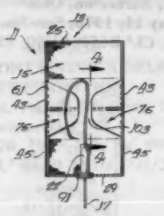
Thomas Q. Wise, Glen Ellyn, Ill., assignor to Belden Corporation, Geneva, Ill.

Filed Nov. 3, 1975, Ser. No. 628,528

Int. Cl.² B65D *85/67*

U.S. Cl. 206—396 **6 Claims**

1. A non-reel dispensing package of coiled strand material comprising an open-center coil of the material capable of being payed out from the interior thereof without rotation of the coil; a perimeter of connected walls surrounding said coil, each said wall having opposed hinged flaps; and a tapered tab located at the center of the edge of each of said flaps opposite the hinged connection thereof to its associated wall, the tabs of the flaps on each of the two opposing sides of said coil



interlocking to form a tapered boss to facilitate payout of the strand material, the two bosses extending into the open center of the coil in spaced facing relation, their facing ends being separated by a gap.

4,019,637

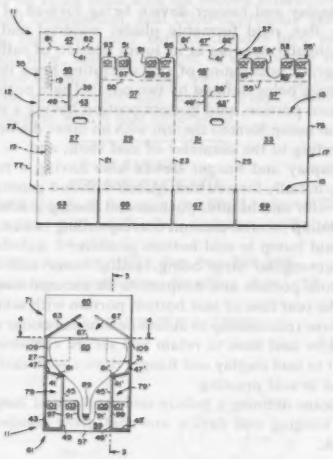
CATHODE RAY TUBE PACKAGING

Joseph M. Kurtz, Ottawa, Ohio, assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 16, 1976, Ser. No. 705,775

Int. Cl.² B65D *85/42*

U.S. Cl. 206—418 **8 Claims**



1. An improvement in a single cavity packaging enclosure for supporting and protecting a cathode ray tube comprising: an integrated packaging structure formed from a unitary sheet of foldable substantially rigid material of substantially elongated shaping having spaced apart alpha and omega fold-score-lines extending longitudinally therein and defining therebetween the central portion of said sheet; three parallel spatially-related fold-score-lines traverse said central portion in a manner normal to said alpha and omega score lines to divide said central portion into first, second, third and fourth integral wall-members and subsequently provide corner formations therefore; extending outward from said alpha score-line related to said first and third wall members are similar integral substantially rectangular extension members wherein each has spaced apart and parallelly related proximal and distal traversal score-lines dividing said extension mem-

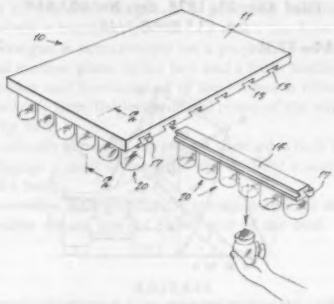
bers into base, side and terminal portions, each of said rectangular extensions having a slot formed therein normal to said alpha score-line in a manner to substantially bisect said base portion and extend partially into said side portion; extending outward from said alpha score-line related to said second and fourth wall members are similar integral substantially configurated alpha closure members wherein each has a structural score-line dividing said member into a rectangular planar portion and a plural-tongue projecting portion, said configurated closure members conjunctively providing a subsequent alpha closure arrangement for said packaging means; extending outward from said omega score-line are separate substantially rectangular flap-like members integral with said respective wall members to collectively provide a subsequent overlapping closure arrangement for said tube packaging means.

4,019,638

HANGING JAR CAP WITH STORING UNIT

Matt Miller, 1118 Bay Oaks, Houston, Tex. 77008

Filed Aug. 14, 1975, Ser. No. 604,717
Int. Cl.² A47F *5/08*
U.S. Cl. 211—74 **5 Claims**



1. In an improved storage unit, the combination of:

a plurality of jars for containing an assortment of various objects,

a screw cap on each jar releasably attached to the jar,

an open loop extending upwardly from each cap, the loop being generally triangular with the base of the triangle adjacent the cap,

a series of notches extending downwardly from the two legs of the open triangular loop,

a plurality of hooks depending from the storage unit, each loop arranged to hang from a hook, whereby each cap and jar attached thereto may be suspended from a hook, and

the hook engaging the loop between adjacent notches such that each jar may be suspended vertically by sideways displacement of the loop when the weight of objects in the jar is offset.

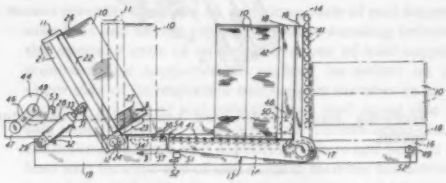
4,019,639

AUTOMATIC PALLETIZER AND METHOD FOR BUNDLED STACKS OF SHEETS

Walter John Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.

Filed Jan. 26, 1976, Ser. No. 652,371
Int. Cl.² B65G *57/28*
U.S. Cl. 214—6 C **16 Claims**

15. A means for automatic palletizing of bundles of sheets, comprising a tiltable means for receiving a row of bundles of sheets, a tiltable collecting means disposed adjacent said tiltable means and having an entrance for collecting said row of bundles of sheets from said tiltable means when the latter is tilted toward said collecting means, support means upstandingly disposed on said collecting means at the side thereof opposite said entrance and disposed to have said bundles of sheets supported against said support means in an upstanding position, said collecting means being tiltable through an angle and toward said side thereof with said support means for disposing said support means in a reclining position with said bundles of sheets thereon and in the reclining position, said tiltable means being tiltable toward and away from said collecting means, rotatable support means on said tiltable means for movably supporting said bundles of sheets thereon and being disposed in two groups rotatable on respective axes at right angles to each other, with one of said groups being axially oriented for moving said bundles of sheets along said tiltable means and the other of said groups being axially oriented for moving said bundles of sheets away from said tiltable means and onto said collecting means.



16. A method for automatic palletizing of bundles of sheets, comprising the steps of disposing a pallet in upstanding position on a tiltable holder, disposing said bundles on a tiltable receiver disposed adjacent said tiltable holder and receiving a row of said bundles thereon, power driving said bundles on said receiver in one tilted position of said receiver, tilting said receiver toward said holder and thereby interrupt the power drive and move said row of said bundles onto said tiltable holder and toward said pallet, positioning the plurality of bundles of sheets in upstanding positions on a declining anti-friction support on said tiltable holder for moving said bundles under gravity to adjacent said pallet, tilting said tiltable holder in the direction toward said pallet and disposing said pallet and said bundles in reclining positions with said bundles on said pallet.

4,019,640

SHEET MATERIAL STACKING AND TRANSFER APPARATUS

M. James Marin, South Norwalk, and Robert E. Mersereau, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed June 16, 1975, Ser. No. 587,388
Int. Cl.² B65H *29/22*
U.S. Cl. 214—6 H **10 Claims**

1. Sheet material stacking and transfer apparatus comprising:

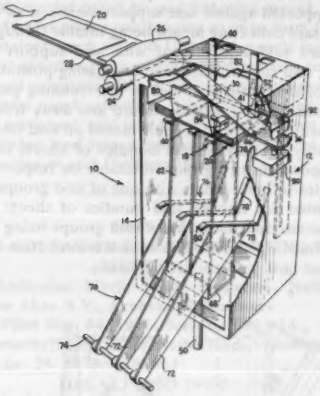
means for receiving sheets of material in stacked relation,

means connected to said receiving means for lowering said receiving means as said sheets of material are stacked on said receiving means,

oscillating means disposed in the path of movement of said receiving means as said receiving means is lowered for removing and transferring said stack of sheet material from said receiving means,

means for forming an auxiliary receiving means that is engageable with a major portion of the lower surface of said stack intermediate its ends for subsequent sequentially fed sheet material while said oscillating means removes and transfers previously accumulated sheet material from said receiving means, and

means for pivoting said receiving means to a complemental attitude with respect to said oscillating means as said



receiving means is lowered towards said oscillating means.

4,019,641

ELEVATING AND CONVEYING SYSTEM FOR UNLOADING VESSELS OR THE LIKE

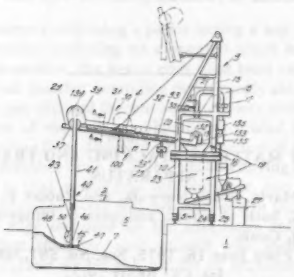
Walter Merz, Allmendboden, Switzerland, assignor to Schweizerische Aluminium AG, Chippis, Switzerland

Continuation-in-part of Ser. No. 426,742, Dec. 20, 1973, abandoned, which is a continuation of Ser. No. 201,517, Nov. 23, 1971, abandoned. This application Oct. 21, 1975, Ser. No. 624,191

Claims priority, application Switzerland, Dec. 2, 1970, 17863/70

Int. Cl.² B63B *27/24*

U.S. Cl. 214—14 **24 Claims**



1. An elevating and conveying system for unloading particulate materials from vessels, or the like, said system comprising:

a source of vacuum;

a first material transport conduit for being disposed approximately vertically in the vessel, or the like during unloading; said first conduit having an upper end and a lower end; a suction inlet orifice located at said first conduit lower end; an outlet at said first conduit upper end; said first conduit having an inside, free cross-sectional area along its entire length narrowed in relationship to the area of the conduit through which the suction force is supplied by said vacuum source such that the particulate material is pneumatically sucked through said first conduit by said vaccum source;

a second material transport conduit disposed more horizontally and having an inlet at one end and having an outlet; said second conduit having an inside, free cross-sectional area along its entire length that is greater than said cross-sectional area of said first conduit; said cross-sectional area of said second conduit being related to the suction force supplied by said source of vacuum such that that said cross-sectional area is large enough to permit and cause particulate material to settle out of the air flow in said second conduit to the bottom of said second conduit;

a joining bend joining said first conduit upper end outlet and said second conduit inlet;

conveying means provided in said second conduit and located generally along the bottom of said second conduit thereby to receive particulate material that settles in said second conduit; said conveying means being designed and adapted for moving the settled particulate material toward said second conduit outlet; means communicating with said second conduit outlet for receiving the particulate material that has been conveyed through said second conduit by said conveying means, blown through said bend and sucked through said first conduit by said vacuum source.

4,019,642

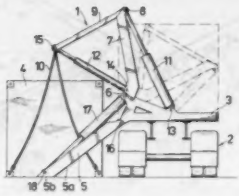
LOADING DEVICE

Bengt-Olof Hammar, Olsforshus 510 35, Bollebygd, Sweden

Filed Aug. 11, 1975, Ser. No. 603,614

Int. Cl.² B60P *1/48*

U.S. Cl. 214—77 R **2 Claims**



1. Loading device arranged on a vehicle having a frame spring mounted on a chassis, said device being adapted to carry out a side-wise transfer of a load onto or away from said vehicle and comprising two lifting means spaced from each other and movable substantially in parallel planes, each lifting means having a supporting leg which can be pivoted outside of the outer contour of the vehicle, said supporting leg being pivotably carried in a pivot bearing close to the outer contour of the vehicle and having a free end portion, a piston-cylinder unit for pivoting said supporting leg having one end pivotably connected to the free end portion of said supporting leg, the other end of said piston-cylinder unit being pivotably carried in a bearing positioned further inside the contour of the vehicle and at a higher level than said pivot bearing of said supporting leg, said supporting leg having a supporting surface extending substantially along the main portion of said leg, and said supporting surface being adapted to reach plane contact with an adjacent load surface by springing action of the vehicle frame relative to the chassis so that the pivot bearing of the supporting leg will arrive substantially at the same level as the adjacent load surface.

4,019,643

HAY CARRYING APPARATUS

Lester R. Kampman, and James H. Hodgson, both of Vinton, Iowa, assignors to Chromalloy American Corporation, New York, N.Y.

Filed July 22, 1975, Ser. No. 598,061

Int. Cl.² B60P *1/28*

U.S. Cl. 214—505 **23 Claims**

1. Apparatus for picking up and transporting a mass of material, said apparatus comrpising, in combination:

a chassis having supporting wheels;

an elongated load carrying bed having a front end and a rear end, said bed being mounted on the chassis for tilting movement about a transverse axis which is in the vicinity of said wheels and of the transverse median plane of the bed;

a draft tongue the forward end of which is attachable to a tractor;

means connecting said draft tongue to the bed adjacent a front corner thereof, said means being constructed and arranged so that at least the forward portion of the draft tongue is swingable with respect to the bed in a generally vertical plane and in a generally horizontal plane;

first power driven means operatively connected to the bed for tilting it between a substantially horizontal transport position, a front loading position with its front end on a

supporting surface, and a rear loading position with its rear end on a supporting surface;

second power driven means for turning the swingable portion of the draft tongue in a generally horizontal plane between a transport position in which the forward end of the tongue is substantially on a projection of the longitudinal median plane of the bed and a front loading position in which said forward end of the tongue is offset laterally outwardly from the longitudinal plane of the adjacent side of the bed;

longitudinally movable means on the bed which is adapted to engage a mass of material and move it toward and end of the bed;

and reversible rotary hydraulic motor means for driving said movable means toward either end of the bed.

4,019,644

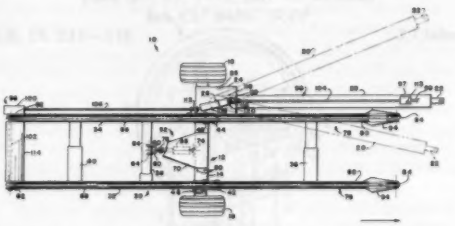
LARGE ROUND BALE HANDLING APPARATUS

Shaun A. Seymour, New Holland, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Continuation of Ser. No. 529,983, Dec. 5, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,609

Int. Cl.² B60P *1//16*

U.S. Cl. 214—506 **8 Claims**



1. An apparatus for handling crop material packages, such as large round bales or the like, comprising:

a transverse mobile frame adapted for movement across a field, said frame including a transverse beam;

a bed assembly including a pair of elongated, laterally spaced apart support members and transverse means extending between and interconnectingsaid support members;

mounting structure secured on said transverse frame beam pivotally mounting each of said support members about a generally common horizontal axis generally intermediately of its opposite ends and positioning each of said support members in spaced relationship above said transverse frame beam;

said transverse means of said bed assembly interconnecting said pair of support members at the lower sides thereof such that an elongated, unobstructed channel is defined between said support members and above said transverse frame beam and said transverse means, said pair of members thereby being capable of supporting a cylindrical bale or the like with its longitudinal axis extending generally parallel to said members and a lower cylindrical portion of said bale or the like extending downwardly into said channel;

means for pivotally tilting said bed assembly about said horizontal axis relative to said frame between a generally horizontal position and a rearwardly inclined position in which forward ends of said support members of said bed assembly are disposed adjacent the field, said tilting means further for supporting said bed assembly at said positions relative to said frame;

means movably mounted on and along each of said support members and having an upper course extending between the opposite ends of its respective one of said support members and supported throughout its extent on an upper side of its respective one support member so as to move on and along and extend above said upper side of said support member and above said unobstructed channel defined between said support members and beyond at least said forward end of said support member for delivering a bale or the like from the field to upon said forward ends of said support members and into said unobstructed channel defined therebetween when said bed assembly is disposed in its rearwardly inclined position and for moving said bale or the like along and through said channel and along and on said upper sides of said support members toward rear ends thereof;

means for driving said movable means; and

an elongated draft member pivotally mounted at one end about a generally vertical axis to said frame and adapted at the other end for attachment to a vehicle for towing said apparatus across the field, said draft member and said frame being pivotally movable relative to each other about said vertical axis for moving said bed assembly and frame between a transport position and a field operating position laterally displaced from said transport position and said towing vehicle.

4,019,645

CRUCIBLE OF FUSED VITREOUS SILICA

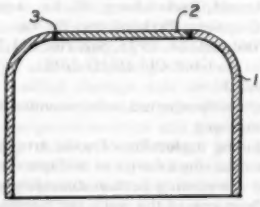
Karl Seiler, Hanau; Martin Selke, Mittelbuchen; Oswald Siegling, Klein-Auheim; Heinz Herzog, Dettingen; Horst Albrecht, Hanau, and Heinrich Mohn, Hailer, all of Germany, assignors to Heraeus-Schott Quarzschmelze GmbH, Hanau am Main, Germany

Filed Dec. 3, 1973, Ser. No. 420,824

Claims priority, application Germany, Dec. 4, 1972, 2259353

Int. Cl.² C03B *23/20;* B65D *23/00;* B01D *1/00*

U.S. Cl. 215—1 R **5 Claims**



1. In a silica containing crucible for making monocrystals having a generally hollow cylindrical portion forming the sides

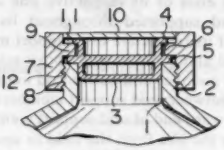
thereof and a bottom portion, the improvement wherein said hollow cylindrical portion has a lower concave terminal end portion about its circumference which is directed inwardly toward the center of said crucible and terminates short of the center of said crucible, said bottom portion joined to said terminal end portion, the junction of said bottom portion and said terminal end portion having a weld seam, said bottom portion having an area equal to at least one-tenth and at most four-fifths of the total area of said terminal end portion and said bottom portion.

4,019,646

CAP WITH INSIDE STOPPER FOR RECEPTACLE

Masanaga Imamura, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Jan. 19, 1976, Ser. No. 650,315
Claims priority, application Japan, Jan. 23, 1975, 50-10178
Int. Cl.² B65D *41/28*
U.S. Cl. 215—329 **9 Claims**



1. A cap assembly adapted to be threaded on the externally screw-threaded neck of a container, comprising: a cap body having a sidewall, said sidewall having an internally screw-threaded, cylindrical axially inner portion adapted to be threaded onto the neck of the container, said cap body having a radially inwardly extending wall portion located axially outwardly of said screw-threaded portion of said sidewall; an inside stopper having a cylindrical sidewall extending generally parallel to and spaced radially inwardly from said inner portion of said sidewall of said cap body and adapted to sealingly engage the internal sidewall of the central opening of the neck of the container, said sidewall of said inner stopper having an annular radially outwardly extending flange adjacent the outer end thereof disposed in radially overlapping relationship with said wall portion of said cap body, said flange extending toward the interior surface of said sidewall with the radially outer edge of said flange being radially inwardly spaced from the interior surface of said sidewall to define an annular gap therebetween so that said inner stopper can move radially relative to said cap body, said wall portion of said cap body being adapted to press said flange against the outer end of the neck of the container; and means for interlocking said cap body and said inner stopper so that they can be removed as a unit from the container.

4,019,647

ELECTRICAL WIRING BOX WITH ATTACHED MOUNTING ELEMENTS

William O. Arnold, Parkersburg, W. Va., assignor to Union Insulating Company, Parkersburg, W. Va.

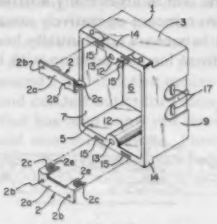
Filed Oct. 14, 1975, Ser. No. 621,772
Int. Cl.² H02G *3/08*
U.S. Cl. 220—3.3 **10 Claims**

1. A box assembly adapted to be mounted to a supporting structure, comprising:

A box including a plurality of walls arranged to define a space for receiving a device in said space, said box further including a mounting portion extending generally transversely from one of the walls and having a first surface and a second surface, said mounting portion having an opening extending therethrough from the first surface to the second surface, said opening having a predetermined height in the direction of the mounting portion and being surrounded by the material of the mounting portion; and

a mounting member comprising:

a unitary bowed locking element having a maximum height essentially equal to the height of the opening in the mounting portion, said locking element being disposed within the opening in the mounting portion with a point along its bowed surface abutting against an inner surface of the opening thereby to retain the locking element within the opening;



a projection extending outwardly from the bowed surface of the locking element at an acute angle and having a free end, said projection being outside of the opening in the mounting portion with the free end thereof abutting angularly against the second surface of the mounting portion along a line generally transverse to the aforesaid one of the walls of the box following the insertion of the locking element into the opening, said free end of the projection facing in a direction toward the first and second surfaces of the mounting portion; and

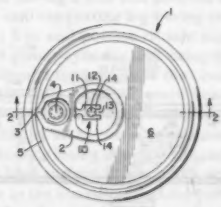
a portion connected with the locking element for use in mounting the box to a supporting structure.

4,019,648

CHILDPROOF CLOSURE

Nick S. Khoury, Worth, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Continuation of Ser. No. 578,686, May 19, 1975, abandoned.
This application Mar. 11, 1976, Ser. No. 666,109
Int. Cl.² B65D *41/32*
U.S. Cl. 220—273 **11 Claims**

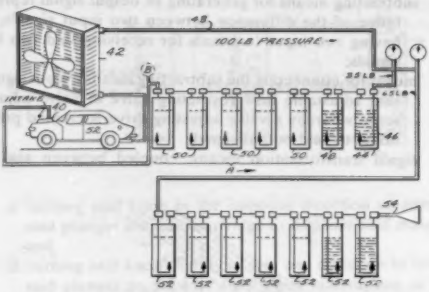


1. An improved safety closure for use on a can or similar container comprising an end panel, a score formed in said end panel and defining an opening flap therein, a pull tab secured to said end panel and having means for fracturing said score to open said consequent to lifting of said tab, retention means for restraining lifting of said tab to fracture said score, and programmable release means for releasing said tab upon application of a preprogrammed force for opening said container, said tab comprising a lift portion, an intermediate portion and a nose portion, said retention means comprising tether means on said lift portion of said tab, and an auxiliary rivet integrally formed in said end panel retainingly cooperative with said tether means.

4,019,649
SAFETY TANK SYSTEM

Sidney Simon, 936 Oranmore St., Pittsburgh, Pa. 15201

Continuation-in-part of Ser. No. 550,589, Feb. 19, 1975, Pat. No. 4,000,726. This application Oct. 20, 1975, Ser. No. 624,161
Int. Cl.² B65D 25/00, 25/18
U.S. Cl. 220—88 B 21 Claims

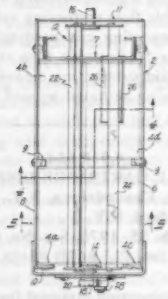


1. A gasoline safety tank system comprising a double walled tank body, a manifold removably secured to said tank body, inlet means mounted to said manifold, outlet means mounted to said manifold, said inlet means and outlet means being interchangeable and adapted to receive and discharge fluid, a conduit connected to said inlet means and extending into the area formed by the inner surface of the inner wall of said tank body adjacent the floor of said tank body, a pressurized gas source means mounted to said manifold and selectively connected to said inlet means to discharge pressurized inert gas into said inner surface through said conduit so that said inert gas bubbles up through the liquid in said inner surface into the top of said tank cooling said liquid and pressurizing the liquid in said tank, said double walled tank body forming a cylindrical compartment filled with an incombustible material which is adapted to be pressurized and transported from said compartment when said compartment has a pressure differential greater than that of the outside atmosphere and communicates with the outside atmosphere.

4,019,650
TANDEM COLUMN VENDER APPARATUS

Kenneth W. Oden, Charles Town, W. Va., assignor to Dixie-Narco, Inc., Ranson, W. Va.

Filed Oct. 29, 1975, Ser. No. 626,643
Int. Cl.² B65G 59/00
U.S. Cl. 221—116 2 Claims



1. In a vending apparatus having opposed longitudinal side walls, a rear wall and a front wall defining a compartment for containing and confining at least two columns of generally cylindrical articles with articles of one column axially displaced from the articles of the other column in a front to rear direction, and a longitudinally extending bail extending below both columns in supporting relation to at least the bottom articles thereof and being mounted for lateral movement from a first position supporting said articles to a terminal position wherein all portions thereof are sufficiently spaced from one side wall to permit downward passage of said articles therebetween, the improvement comprising:

said bail comprising an inverted V-shaped, one piece, elongated member having a laterally extending longitudinal flange defining a portion of the edge thereof nearest said one side wall, said one side wall being planar;

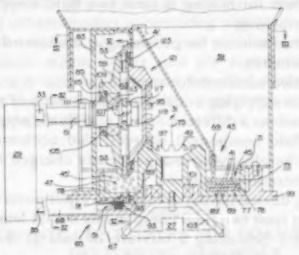
said flange below only one of said columns extending farther toward said one side wall than the remainder of the member whereby said bail may be moved laterally away from said one side wall to permit the bottom article of the other of said columns to drop therepast while said flange supports the bottom article of said one column and further lateral movement of said bail to said terminal position then permits said bottom article of said one column to drop therepast;

said bail being pivotally mounted for arcuate swinging movement about a fore-and-aft axis, and means in rigidly fixed relation thereto and swingable therewith and arranged to swing into supporting engagement with those articles of said columns above said bottom articles in response to swinging movement of said bail away from said first position.

4,019,651
SEED PLANTER WITH A SUCTION PICKUP MECHANISM

George N. Starr, Memphis, Tenn., and Boyd C. Robertson, Jr., Jonesboro, Ark., assignors to Floyd R. Bridger, Jr., Jonesboro, Ark.

Filed Sept. 19, 1975, Ser. No. 615,174
Int. Cl.² A01C 7/04
U.S. Cl. 221—211 11 Claims



1. In a seed planter of the type incorporating a suction pump in conjunction with the seed pickup mechanism and having ground engaging drive means operable by pulling the seed planter along over the ground, and a hopper for containing a given supply of the seeds intended to be planted; the improvement which comprises dispensing means for dispensing from said hopper a layer of the seeds thus establishing a stable seedbed having a predetermined thickness, a seed pickup chamber disposed adjacent said dispensing means, means coupled to said ground engaging drive means for carrying said seedbed through said seed pickup chamber, said means for carrying said seedbed through said seed pickup chamber including an annular continuous trough rotatably driven about a vertical axis interposed between said dispensing means and said seed pickup chamber, said trough having an annular bottom with said seedbed being restingly supported thereon, means for expanding said seedbed whereby the density of said seedbed is decreased resulting in an increased thickness of said seedbed while it passes through said seed pickup chamber, said means for expanding said seedbed including a source of air under pressure and including means for communicating

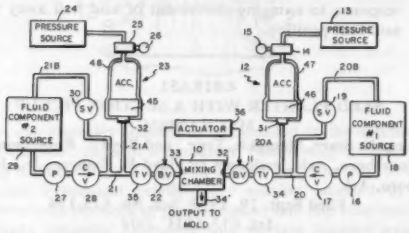
said seed pickup chamber with said source of air under pressure which is effective to slightly lift and separate the seeds whereby an unstable or fluidal state exists within said seedbed as it passes through said seed pickup chamber, said seed pickup mechanism including at least one nozzle means coupled to said grouhd engaging drive means and being communicated with said suction pump for repeatedly withdrawing one seed at a time from said expanded seedbed, said nozzle means being cyclically moved into said seed pickup chamber at a spaced distance above said stable seedbed thence to a seed discharge zone, and means for releasing the seeds from said nozzle means as said nozzle means enters said seed discharge zone thus enabling the seeds to subsequently gravitate to the ground at predetermined spaced apart intervals.

4,019,652

FLUID DELIVERY AND MIXING SYSTEMS

Nam P. Suh, Sudbury; Salvatore C. Malguarnera, Medford, and Frederick H. Anderson, Reading, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 5, 1975, Ser. No. 628,965
Int. Cl.² B67D *5/60*
U.S. Cl. 222—1 **13 Claims**



1. A system for mixing at least two fluid components, said system comprising

at least two sources for providing at least two different fluid components;

at least two accumulator means;

means for supplying under pressure to each of said accumulator means a different one of said fluid components from said fluid component sources, said accumulator means each thereby being independently charged to a selected predetermined pressure;

a mixing device having at least two input ports for receiving said at least two fluid components and at least one output port for delivering a mixture of said at least two fluid components therefrom; and

means associated with each of said accumulator means for independently controlling the mass flow rates of each of said fluid components being supplied to said mixing device from each of said accumulator means, said controlling means being operable to supply said at least two fluid components from said accumulator means substantially simultaneously to said mixing device.

4,019,653

AUTOMATIC PROPORTIONING PAINT SPRAY SYSTEM

William C. Scherer, Minneapolis, Minn., and Raymond A. Vincent, Detroit, Mich., assignors to Graco Inc., Minneapolis, Minn.

Filed Aug. 22, 1975, Ser. No. 606,926
Int. Cl.² B05B *7/04*; B67D *5/28*
U.S. Cl. 222—1 **25 Claims**

1. An apparatus for the controlled proportioning and mixing of two paint components during the flow of said components to a paint spray gun, comprising:

a first flow sensor coupled to the flow path of the first paint component, said sensor having means for generating a signal representative of the rate of flow of said first paint component;

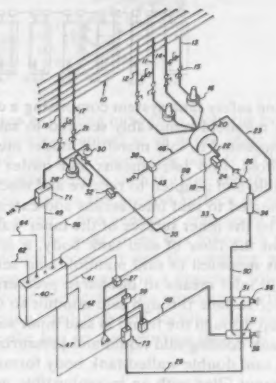
a second flow sensor coupled to the flow path of the second paint component, said sensor having means for generating a signal representative of the rate of flow of said second paint component;

an adjustable flow restricting valve in the flow path of the first paint component;

subtracting means for generating an output signal representative of the difference between two input signals, and having two input terminals for receiving said two input signals;

means for connecting the subtracting means output signal to said adjustable flow restricting valve in valve adjusting sense whereby a valve adjusting drive is created proportional to said output signal;

signal transformation means, coupled between said first



flow sensor means for generating a signal and said subtracting means first input signal terminal, for selectively transforming the magnitude of said signal representative of the rate of flow of said first paint component;

means for manually setting the selective signal transformation level of said signal transformation means;

means for coupling said second flow sensor signal representative of the rate of flow of said second paint component to said subtracting means second input signal terminal;

means for sensing the initial flow to said spray gun and for generating a blocking signal for a predetermined time after said initial flow is sensed;

means for generating a predetermined initial position signal for said adjustable flow restricting valve; and

switch means, connecting said predetermined initial position signal to said adjustable flow restricting valve and disconnecting said subtracting means output signal, said switch means being actuated by said blocking signal.

4,019,654

MANUAL CARTRIDGE DISPENSER

Dick T. van Manen, Canandaigua, N.Y., assignor to Voplex Corporation, Pittsford, N.Y.

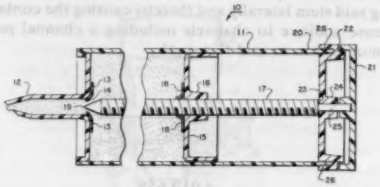
Filed Feb. 25, 1976, Ser. No. 661,294
Int. Cl.² B65D *83/00*
U.S. Cl. 222—1 **12 Claims**

9. A method of dispensing material from a disposable cartridge having a disposable resin plunger positioned inward from the rear end of said cartridge and having a threaded and sealed central opening, said dispensing method using a threaded rod having a turning knob and a relatively rotatable anchorage adapter, and said method comprising:

a. turning said knob and said rod in one direction to thread

said rod through said plunger and said seal and to advance said rod through said material to bring said adapter adjacent said rear end of said cartridge;

b. manually moving said adapter onto said rear end of said cartridge for removably securing said adapter to said rear end of said cartridge;



c. turning said knob in the opposite direction to advance said plunger into said cartridge to dispense said material; and

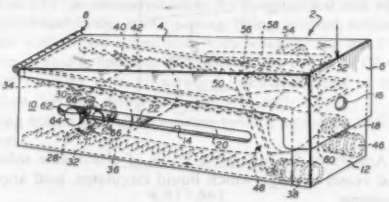
d. turning said knob slightly in said one direction to retract said plunger to prevent drool upon interruption of said dispensing.

4,019,655

MECHANICAL DISPENSER

Wolfgang W. Moeller, 4 Glen Cove Drive, Glen Head, N.Y. 11545

Filed Dec. 17, 1975, Ser. No. 641,710
Int. Cl.² B65D *35/28*
U.S. Cl. 222—96 **17 Claims**



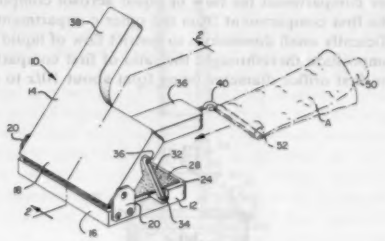
1. A dispenser comprising a housing and a face plate, said face plate having an openable and closable aperture therein through which material in said housing is dispensed, said housing having a cover pivotally connected thereto and carrying an overplate which ridably overlies said face plate, said housing having therewithin a compressor, said compressor having engaging means, said engaging means engaged in a longitudinally disposed track in said housing, an actuating means connected to said cover and connected to a transmission for urging said compressor longitudinally within said housing; whereby when it engages a container within said housing of a yieldable material containing material to be dispensed, said material is dispensed, said transmission comprising a first rack and a second rack, said first rack facing said second rack, said first and second racks running along a side of said compressor in the direction of travel of said compressor, said first rack being connected to a spring biased against said face plate and being movable in the direction of travel of said compressor, said second rack being stationarily secured to said housing and running longitudinally therewith; said actuating means comprising a lever hingedly positioned against said cover on the inside thereof and biased against said spring, said first and second racks engaged by a yieldable leaf spring attached to said compressor.

4,019,656

COLLAPSIBLE TUBE SQUEEZING DEVICE

Cecil Julius Spears, 112 McFarland Road, Enfield, N.C. 27823

Filed Apr. 26, 1976, Ser. No. 680,280
Int. Cl.² B65D *35/28*
U.S. Cl. 222—103 **4 Claims**



1. A collapsible tube-squeezing device comprising a pair of pivotal substantially planar jaw members, each of said substantially planar jaw members having a front edge and a rear edge to receive a portion of a collapsible tube therebetween said jaw members including:

a. a bevelled surface along the rear edge of one of the said jaw members;

b. a pair of links;

c. one of each of the pair of links being secured to the side edges of the other of the jaw members adjacent the rear edge;

d. pivot pin means pivotally connecting the said one jaw member to said pair of links with the bevelled edge generally directed toward the other of the jaw members;

e. a pair of operating handles, one of said handles being attached to each of said jaw members and off-set to one side of the front edges and extending forwardly of the collapsible tube receiving portions of the jaw members, said off-set handles cooperating with each other in applying pressure between said jaw members; and,

f. resilient means urging said jaw members into a closed position and wherein said bevelled surface cooperates with the other jaw member to grip the sealed edge of a collapsible tube.

4,019,657

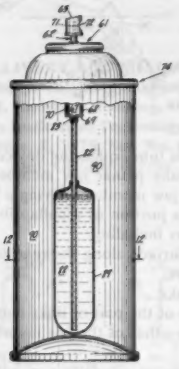
AEROSOL CONTAINERS FOR FOAMING AND DELIVERING AEROSOLS

Joseph George Spitzer, 44 Coconut Row, Palm Beach, Fla. 33480; Marvin Small, 1100 Park Ave., New York, N.Y. 10028; Lloyd I. Osipow, 2 Fifth Ave., New York, N.Y. 10003; Dorothea C. Marra, 107 Fernwood Road, Summit, N.J. 07901

Continuation-in-part of Ser. Nos. 554,388, March 3, 1975, Pat. No. 3,970,219, and Ser. No. 566,562, April 9, 1975, abandoned, and Ser. No. 620,448, Oct. 7, 1975, abandoned, and Ser. No. 628,283, Nov. 3, 1975, abandoned. This application Mar. 26, 1976, Ser. No. 670,913
Int. Cl.² B65D *83/14, 83/00*
U.S. Cl. 222—136 **11 Claims**

1. An aerosol container for foaming an aerosol composition therein prior to expulsion from the container, and then expelling the resulting foam, comprising, in combination, a pressurizable container having a valve movable between open and closed positions, with a valve stem, a foam-conveying passage therethrough and a delivery port in flow connection therewith; bias means for holding the valve in a closed position; and means for manipulating the valve against the bias means to an open position, for expulsion of aerosol foamed composition within the container via the valve passage and delivery port;

means defining at least two separate compartments in the container, of which a first compartment has a volume of at least 0.5 cc and is in direct flow connection with the valve passage, and a second compartment is in flow connection with the valve passage only via the first compartment; at least one first liquid tap orifice having a diameter within the range from about 0.012 to about 0.2 cm and communicating the first and another compartment for flow of liquid aerosol composition into the first compartment from the other compartment, and of sufficiently small dimensions to restrict flow of liquid aerosol composition therethrough; the ratio of first compartment volume/first orifice diameter being from about $10/x$ to about



$400/x$, where x is 1 when the orifice length is less than 1 cm, and 2 when the orifice length is 1 cm or more; at least one second gas tap orifice having a total cross-sectional open area within the range from about 4×10^{-5} to about 1.3×10^{-2} cm^2 and communicating the first and second compartments for flow of propellant into the first compartment from the second compartment therethrough, and of sufficiently small dimensions to restrict flow of propellant gas and form bubbles of such gas in liquid aerosol composition across the line of flow thereof to the valve, thereby to foam the aerosol composition upon opening of the valve to atmospheric pressure, and to expel foamed aerosol composition through the open valve.

4,019,658

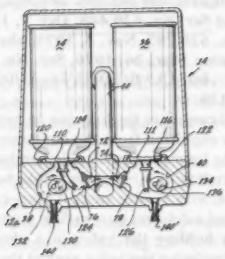
COMBINATION SHOWER HEAD AND TOILETRIES MIXING AND DISPENSING APPARATUS

Kenneth E. Consaul, 3100 Plaza Drive, Penthouse I-12, Santa Ana, Calif. 92704

Filed July 24, 1975, Ser. No. 599,007

Int. Cl.² B67D *5/54*

U.S. Cl. 222—144.5 **5 Claims**



1. As an article of manufacture, means comprising a housing having in it a flow path for shower water and plurality of disposable dispensing type containers for additive for shower water, each of the containers having at one end a dispensing means including a stem actuatable by a lateral tilting movement thereof to dispense additive from the container, the housing having a wall part to which the containers are attached, selectively actuatable rotor means in said wall part for tilting said stem laterally and thereby causing the containers to dispense additive to channels including a channel providing communication to said flow path.

4,019,659

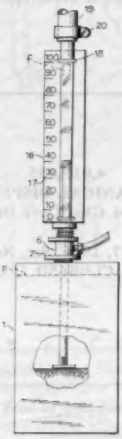
SOLIDS LEVEL INDICATOR

William F. Deneen, 306 E. Forest St., Marengo, Ill. 60152

Filed May 21, 1975, Ser. No. 579,852

Int. Cl.² B67D *5/22, 5/54*

U.S. Cl. 222—193 **5 Claims**



1. Apparatus for indicating levels of dissolvable solids in a closed vessel through which liquid circulates, said apparatus comprising:

a substantially transparent duct having open top and bottom ends wherein the bottom end registers with the vessel and the top end is an inlet for introducing liquid into the vessel;

an elongated gauge member telescopically mounted in said duct for reciprocation therein, said elongated gauge member projecting beyond the bottom end of said duct and into said vessel and being provided with a solid foot which rests on said solids while the fluid circulates, means for conveying the liquid from the inlet and over the foot to hold the foot in engagement with the solids, wherein the level of the solids in the vessel controls the height of the gauge in the duct and wherein a selected portion of the gauge member is visible through the duct thereby indicating the level of solids in the vessel;

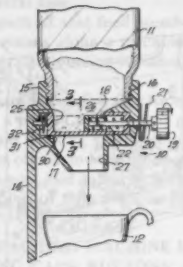
mounting means for coupling said apparatus to the vessel, said mounting means including an annular connector through which the duct member extends, said annular connector having a diameter greater than the duct member, so that there is an annular space between the annular connector and the duct member which registers with the vessel, and

an outlet through the annular connector wherein liquid in the vessel exits from the vessel through the outlet as the liquid dissolves the solids.

4,019,660
INSTANT COFFEE DISPENSER

R. Scott Berkey, 11425 Miller Road, Whittier, Calif. 90604

Filed Dec. 29, 1975, Ser. No. 644,767
Int. Cl.² G01F 11/26
U.S. Cl. 222—304 4 Claims



1. A device for dispensing a pre-measured amount of a particulate solid, said device comprising:

a base member;

jar attachment means affixed to said base member for holding a jar of particulate solid in an inverted position said attachment means having a generally horizontal cylindrical opening for holding a dispensing cylinder and further having a spout for directing solid from the device;

a dispensing member having a partially hollow cylindrical body positioned in the cylindrical opening of said jar attachment means, said cylindrical body having a cavity with piston means therein, said piston means being connected to an arm extending outwardly of the jar attachment means, and positioning means affixed to said arm for longitudinally affixing said piston within said cavity and an opening the ends of which extend over no more than 180° as measured from the longitudinal axis of said cylindrical body, said opening being located within the side wall of the cylindrical body whereby the axial rotation of said cylindrical body causes the cavity to fill when said opening is in an upward orientation and to empty when it is in a downward position; and

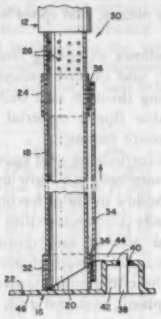
biasing means urging said piston toward a closed configuration.

4,019,661
LIQUID DISPENSER FOR SELECTIVE UPSIDE DOWN OR RIGHT SIDE UP USE

Janos Szabo, 214 E. 82nd St., New York, N.Y. 10028

Filed July 17, 1975, Ser. No. 596,730
Int. Cl.² B67D 5/40
U.S. Cl. 222—376 1 Claim

1. A liquid dispenser for a container for dispensing liquid in a first mode when said container is upright and in a second mode when said container is upside down, said dispenser comprising: removeable cap means for the top of said container; pump and nozzle means mounted through said cap means; a suction tube within said container coupled to said pump and nozzle means and extending downward towards the bottom of said container; a first fluid intake opening in said tube proximate the top of said container; first sealing means slideably mounted on said tube proximate said first intake opening, said first sealing means being positionable in an upper position for covering said first intake opening and in a lower position for uncovering said first intake opening; a second fluid intake opening formed in said tube proximate the bottom of said container; second sealing means slideably mounted on said tube proximate said second intake opening; said second sealing means being positionable in an upper position for uncovering said second intake opening and in a lower position for covering said second intake opening; linkage means extending between and attached to said first and second sealing means for linking said first and second sealing means for movement as a unit; and control means coupled to

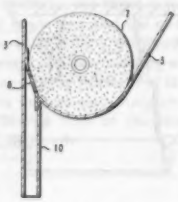


said linkage means and extending through a wall of said container for enabling manual application of a force for moving said unit.

4,019,662
FEEDER FOR COHERENT PARTICULATE MATERIAL

Paul Robert Dana, Wilmington, Del., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Apr. 9, 1973, Ser. No. 349,305
Int. Cl.² G01F 11/20
U.S. Cl. 222—414 7 Claims



1. A device for spreading coherent powder, said device comprising

a powder storage bin having a foraminous wall discharge area located to provide an uninterrupted vertical path to a substrate, said foraminous wall containing perforations of dimension between 0.02 inch and 0.125 inch;

a cylinder of pore-bearing resilient reticulated foam rotatably mounted within said bin and disposed such that on rotating it presses against the wall discharge area forcing said powder through perforations;

means for rotating said cylinder; and

means for moving the device over the substrate.

4,019,663
SEPARATING MEANS FOR PLASTIC CLOSURE TOP

Gunter Krautkramer, Budenheim, Mainz, Germany, assignor to Patentkommerz AG, Zurich, Switzerland

Filed July 8, 1975, Ser. No. 594,371
Claims priority, application Sweden, July 9, 1974, 89830/74
Int. Cl.² B65D 47/10
U.S. Cl. 222—529 2 Claims

1. In an integrally formed plastic closure means for closing an opening in a container wherein said closure means comprises:

a base, said base having a bottom which has an opening into it; a ring at said base which is adapted to be introduced into the container opening; a snap fastening slot on said

base for seating against the container, thereby to hold said closure means in position on the container;

a noncompressible spout defined at the opposite end of said closure means from said base and comprising an opeing into said closure means; said spout having a base end and a closable end;

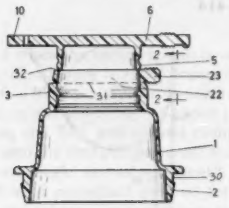
a compressible bellows extending from said base to said spout base end; said closure means being hollow from said base opening through said bellows and said spout, thereby to enable fluent material to pass completely through said closure means;

a closure element for closing said spout opening; said closure element comprising a hollow cylinder having a first open end; said hollow cylinder having an opposite second end; an integrally connected disc sealing closed said cylinder second end of said closure element; joining means for joining said closure element to said spout closable end; and the entire said closure means being a one piece, integral plastic material unit,

the improvemet comprising:

said joining means comprising a tear band interposed between and integrally connected on the one hand with said closure element cylinder first end and on the other hand with said spout around said spout closable end;

at said integral connection between said spout closable end and said tear band is defined a first tearable section that is comprised of such material and that is of such thickness and that has such characteristics that it is adapted to be torn upon application of tearing force thereto;



at said integral connection between said closure element cylinder first end and said tear band is defined a second tearable section that is comprised of such material and that is of such thickness and that has such characteristics that it is adapted to be torn upon application of tearing force thereto;

a graspable handle integrally formed on said tear band such that grasping and pulling said handle tears said first and said second tearable sections and thereby tears said tear band from said closure means and enables removal of said tear band, to initially separate the integrally connected said tear band from both of said spout and said closure element;

said compressible bellows being shaped such that when said bellows is compressed, the portion of said spout and of said closure element at said tear band are compressed by the compression of said bellows inside the portion of said bellows away from said tear band, whereby said tear band and said tearable sections are within and protected by said bellows;

said spout and said closure element cylinder being respectively cooperatingly contoured such that said closure element cylinder is shaped to seal said spout opening after said tear band has been removed from said closure means; said closure element having a grippable portion by which said closure element can be held, removed and replaced on said spout opening.

4,019,664

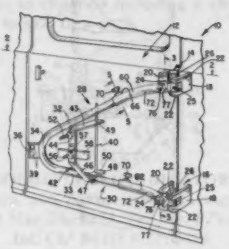
WHEEL AND TIRE CARRIER FOR ATTACHMENT TO MOTOR VEHICLE DOORS

Raywood C. Weiler, 17586 Vine St., Fontana, Calif. 92335

Filed Nov. 21, 1975, Ser. No. 634,198

Int. Cl.² B62D *43/02*

U.S. Cl. 224—42.24 **6 Claims**



1. A wheel and tire carrier for attachment to the door of a motor vehicle in which the door is hingedly supported adjacent its rear edge by upper and lower hinge means, said wheel and tire carrier comprising a frame member having upper and lower arms and a vertical rod supported between said arms, an extension attachable to each of the free rear ends of the upper and lower arms, fastening means for securing the opposite ends of the extensions to the door hinges, fastening means for securing the front end of the frame member to the door adjacent the front end of the door, a bracket slidable vertically on said vertical rod and swingably supported on said frame member intermediate the front and rear of said frame member, said bracket adapted to be manually moved from a non-use position where is it substantially positioned between the arms of the frame member to its in-use position at right angles to the frame member, said bracket having means at its lower end to engage said lower arm of said frame member when it is moved to its in-use position to retain said bracket at right angles to said frame member.

4,019,665

FEED DEVICE FOR ROD OR STRIPLIKE MATERIAL

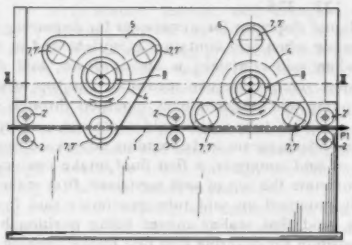
Klaus Ritter; Hans Gott; Gerhard Ritter, and Josef Ritter, all of Graz, Austria, assignors to Firma Evg Entwicklungs-u Verwertungsgesellschaft, Graz, Austria

Filed Dec. 19, 1975, Ser. No. 642,387

Claims priority, application Austria, Dec. 20, 1974, 10211/74

Int. Cl.² B65H *51/18*

U.S. Cl. 226—112 **7 Claims**



1. A feed device for rod- or strip-like material, comprising, in combination:

a housing:

at least two feed members each having a central axis and being longitudinally spaced apart from each other to define a feed path for said material;

a plurality of gripping means disposed on each of said feed members about its central axis and each of said gripping means being operable for engaging and moving said material along said feed path;

driving means disposed in said housing and operable for rotating each of said feed members around its central axis and simultaneously, around a fixed axis parallel to the respective central axis;

the rotation of each of said feed members moving each of said gripping means along a trochoidal path including a substantially straight portion substantially along said feed path;

said gripping means being operable for moving said material along at least a part of said straight portion;

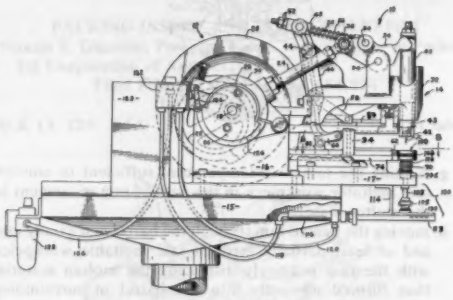
said driving means rotating said feed members so that said gripping means of one and the other of said feed members alternately engage said material with an overlap in the respective periods of time engagement.

4,019,666

FASTENER ATTACHING MACHINE HAVING MEANS FOR ORIENTING CAPS, BUTTONS, AND THE LIKE

Jonathan Asa Foults, Wolcott, Conn., assignor to Scovill Manufacturing Company, Waterbury, Conn.

Filed Nov. 10, 1975, Ser. No. 630,449
Int. Cl.² A41H *37/10*
U.S. Cl. 227—119 **9 Claims**



1. In an attaching machine for fastener elements each having a depression offset from its center, the machine having a vertically fixed die surrounded by a vertically movable element-receiving gripping head and a movable setting plunger adapted to cooperate with the die, a horizontally disposed slide bracket directed at said head and a pusher for moving the element along the slide bracket to the head, said bracket having means for rotating the element, the pusher having a depression-engaging finger adapted to hold the element from rotating and hold the rotary orientation of the element once the orientation is in a predetermined direction as the element moves along the slide bracket; the improvement including means to rotate the die and head about a vertical axis to re-orient the fastener element to the desired extent prior to the descent of the setting plunger toward the die.

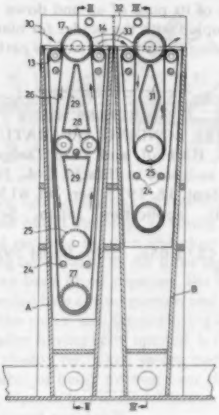
4,019,667

MACHINE FOR CONVEYING A MATERIAL IN WEB FORM THROUGH TREATMENT TUBS

Lodovico Falomo, Strada Statale Pontebbana Orcenigo Inf., Zoppola (Pordenone), Italy

Filed Jan. 17, 1975, Ser. No. 542,044
Claims priority, application Italy, Jan. 24, 1974, 19772/74
Int. Cl.² B65H *17/34*
U.S. Cl. 226—171 **9 Claims**

1. An apparatus for conveying a sheet material within a tub of a treatment installation including a plurality of adjacent tubs in which treatment baths for the sheet material are contained, said apparatus comprising two first parallel rotary rollers placed in laterally spaced relationship at the top of the tub, a second parallel rotary roller located below said first rollers at a selected distance thereform, a flexible endless web passing over each one of said first rollers and below said second roller to form within the tub an innermost U-shaped bend engaged with the first and second rollers and having an inner surface adapted to accompany the sheet material through a U-shaped path within the tub and an outermost U-shaped bend provided with tensioning means, driving means coupled to at least one of said first and second rollers



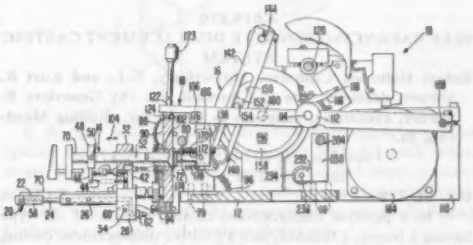
to rotate the coupled roller and to consequently advance the flexible web, a rotary pressure cylinder parallelly resting on the first rollers to maintain the sheet material adherent to the flexible web at the beginning and the end of said U-like path and parallel rotary idler rollers disposed intermediated said first and second rollers and cooperating with the inner surface of the descending and rising portions of the innermost bend of the flexible web to engage and maintain the sheet material adherent to the flexible web at the descending and rising portions of said U-like path.

4,019,668

MECHANISM AND METHOD FOR MOVING TOOL OR THE LIKE

John C. Diepeveen, 1737 Kimberly Drive, Sunnyvale, Calif. 94086

Filed Dec. 30, 1974, Ser. No. 537,523
Int. Cl.² B23K *37/04*
U.S. Cl. 228—3.1 **21 Claims**



1. A transfer mechanism comprising: a support; a holder for a device to be moved from a first location to a second location spaced from said first location; means on the support and coupled with the holder for mounting the latter for substantially rectilinear up and down movement relative to the support, whereby the holder can move toward and away from either of said locations when the same is vertically aligned

therewith, said holder being carried on said mounting means for substantially rectilinear fore and aft movement relative to said support, whereby the holder can move between respective positions vertically aligned with and spaced from said locations; means coupled with the mounting means for moving the holder toward and away from a location vertically aligned therewith; means independent of said moving means and coupled with the holder for shifting the same relative to said mounting means and between said positions; first means coupled with the holder for biasing the same in a direction extending longitudinally of its path of up and down movement; and second means coupled with the holder for biasing the same in a direction extending longitudinally of its path of fore and aft movement.

4,019,669

WIRE BONDING APPARATUS

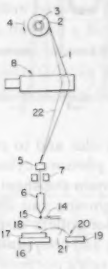
Michio Tanimoto, Hachioji, and Yuzo Taniguchi, Kunitachi, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 15, 1975, Ser. No. 613,542

Claims priority, application Japan, Sept. 13, 1974, 49-105021

Int. Cl.² H05K *13/06*; **B65H** *59/16*

U.S. Cl. 228—4.5 **10 Claims**



1. A wire bonder comprising: a spool for supplying the wire to be bonded, a shaft means for rotatably mounting said spool, means for holding the wire in a position extended downwardly from said spool, means disposed between said spool and said holding means for tensioning the wire, said means for tensioning including a means for directing a jet of a gas against the wire and means for regulating the flow of the jet of gas, said regulating means including a pair of guide plates, said guide plates being spaced from one another and disposed along the flow of the jet of gas, the wire extending from said spool through the space between said guide plates to said holding means, said holding means including a capillary bonding head, and means for applying a back tension on said spool.

4,019,670

SELF-BALANCING POSITIVE DISPLACEMENT CASTING SYSTEM

Robert Holbrook Cushman, Shrewsbury, N.J., and Kurt R. Stirner, deceased, late of Churchill, Pa. (by Genevieve E. Stirner, executrix), assignors to Gould Inc., Rolling Meadows, Ill.

Filed Jan. 21, 1974, Ser. No. 435,172

Int. Cl.² B23K *37/02*, *37/04*

U.S. Cl. 228—45 **5 Claims**

1. In a positive displacement casting system of the type having a frame, a bracket, and a positive displacement casting head including a barrel and a coaxial ram suspended from the frame, the method of supporting and activating said head comprising the steps of:

a. mounting the ram and bracket on a piston associated with first fluid operated means carried by the frame;

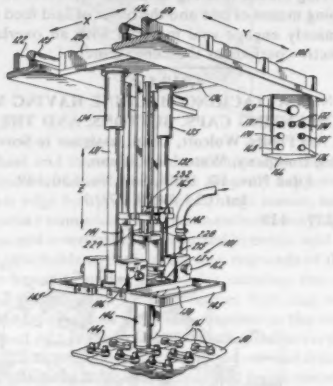
b. mounting the barrel in coaxial surrounding relation to the ram on the piston associated with second fluid operated means carried by the bracket;

c. pressurizing said first fluid operated means so as to balance the weight of said head and to establish a balanced float condition therefor;

d. positioning a meltable workpiece on a support surface beneath said head and relatively aligning said workpiece and the ram on a common work axis;

e. manually shifting said head downwardly against the balanced float force maintained by said first fluid operated means so as to engage the barrel with said meltable workpiece;

f. pressurizing said first fluid operated means to overcome the balance force theretofore applied and urging the ram into engagement with said meltable workpiece;



g. heating the ram to a temperature sufficient to convert said meltable workpiece in the path of ram movement to the molten state;

h. moving the heated ram through the barrel and axially into and at least partially through said meltable workpeice with the ram positively displacing the molten material thus formed upwardly into the barrel in surrounding relation with the ram; and

i. reversing the pressure conditions on said first fluid operated means while maintaining said second fluid operated means depressurized so as to retract the ram from engagement with any unmelted portion of said workpiece and the molten material.

4,019,671

METHOD FOR DIP-SOLDERING SEMICONDUCTOR COMPONENTS

Altan Akyuerek, Heppenheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Mar. 11, 1976, Ser. No. 665,762

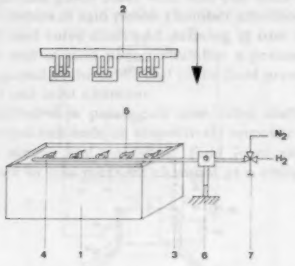
Claims priority, application Germany, Mar. 14, 1975, 2511210

Int. Cl.² H01L *21/60*

U.S. Cl. 228—123 **2 Claims**

1. A method of dip-soldering semicondictor components, in particular components mass-produced with the use of comb elements, comprising the steps of:

homogeneously sweeping the surface of a solder bath with a hydrogen gas flame; and



dipping said semiconductor components and contact elements, in a flux-free state, into said solder bath.

4,019,672

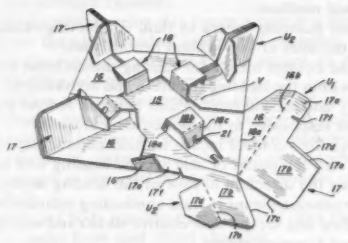
PACKING INSERT AND BLANK THEREFOR

Nunzio E. Giannini, Pompton Lakes, N.J., assignor to Packaging Corporation of America, Evanston, Ill.

Filed Feb. 3, 1976, Ser. No. 654,894

Int. Cl.² B65D *5/58*

U.S. Cl. 229—14 C **11 Claims**



1. A packing insert formed from a blank of foldable sheet material and adapted for disposition within a multi-sided container to position a product in a predetermined relation within the container interior, said insert comprising a base panel having a peripheral configuration corresponding substantially to the area delimited by the side walls of the container, a plurality of foldable support units adjacent predetermined corners of said base panel and protruding from a surface of said base panel and inwardly towards the center of said base panel, and a plurality of retainer means struck out from said base panel and interlocking with said support units and retaining same in predetermined folded relation with respect to said base panel, the number of said retainer means corresponding to the number of said predetermined corners; each support unit including a first section overlying in face-to-face relation a surface of said base panel, said first section being foldably connected to a peripheral segment of said base panel adjacent a predetermined corner of said base panel, and a second section disposed inwardly of the periphery of said base panel and being foldably connected to said first section and protruding transversely from said base panel surface, said second section having an inner portion thereof engaged and retained by a retainer means in said transversely protruding relation with respect to said base panel surface.

4,019,673

CARDBOARD BOX

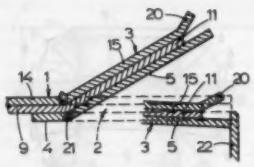
Arnold Salomons, Amersfoort, Netherlands, assignor to Gladu A.G., Glarus, Switzerland

Filed Apr. 2, 1976, Ser. No. 673,105

Claims priority, application Netherlands, Apr. 8, 1975, 7504187

Int. Cl.² B65D *5/72*

U.S. Cl. 229—17 R **2 Claims**



1. A cardboard box comprising a three layered wall portion provided with an outlet opening, a closing lip which can be swung open and reclosed to open and close said outlet opening, said lip being constituted by the three layers of material of the box that have been glued together, the middle closing-lip layer being bounded by a cutout portion and being shorter and narrower than the outer and inner closing-lip layers, so that the closing lip, after having been opened, is clampingly reclosable since said closing lip, when swung back to the reclosed position, is capable of being pressed over the entire width of its free end, one layer of box material farther into the box than in the original closed position.

4,019,674

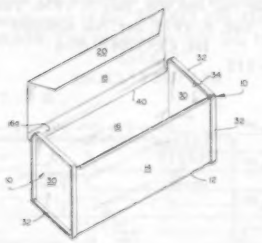
RIGID WALLED STRUCTURES FOR CONTAINERS, FURNITURE AND THE LIKE

Gerald S. Ikelheimer, and Gilbert d'Andrea, both of Yorktown Heights, N.Y., assignors to Ikelheimer-Ernst, Inc., New York, N.Y.

Filed June 30, 1975, Ser. No. 591,571

Int. Cl.² B65D *3/10*

U.S. Cl. 229—23 R **8 Claims**



1. A rigid walled support structure comprising a pair of spaced rigid cap members of resinous material each selectively contoured to provide main rigid walled support panel portions each perimetrically bounded by a transversely extending wall portion defining corresponding internally facing U-shaped receiving and retainer slots; and

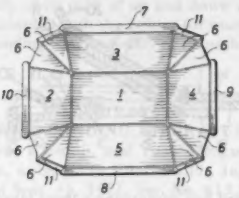
an intermediate rigid walled unitary support body portion selectively contoured to define boundary portions which correspond to the main panel portions and having a predetermined portion of the terminal marginal edges of the body portion disposed within said receiving slots;

said terminal marginal edges of said body portion being disposed within said U-shaped slots engaging the adjacent interfacial surfaces of said cap members.

4,019,675
LOCKING CONTAINER

Rolf Andersson, Lund; Bengt Björklund, Kavlinge, and Tommy Hedberg, Lund, all of Sweden, assignors to AB Akerlund & Rausing, Lund, Sweden

Filed Oct. 21, 1975, Ser. No. 624,411
Claims priority, application Sweden, Nov. 8, 1974, 7414033
Int. Cl.² B65D *5/24, 5/12*
U.S. Cl. 229—31 R **8 Claims**

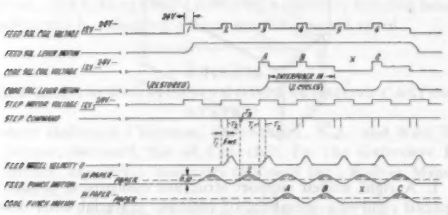


1. A container comprising a bottom wall, at least one wall projecting upwardly from said bottom wall to define a cavity, said at least one wall comprising at least two oppositely disposed side portions, a flange projecting outwardly from said wall, said flange having reinforcing means secured thereto at said side portions, a cover member comprising an outer edge flange integral with an inner countersunk portion disposed in a different plane than said outer edge flange and connected thereto by a substantially vertical portion, said reinforcing means being so constructed that it extends inwardly from said wall into said cavity to receive and lock in place said cover member in sealing relationship to said container, and said countersunk portion and said substantially vertical portion cooperating with said reinforcing means to lock said cover member in sealing relationship to said container.

4,019,676
TAPE PUNCH MACHINE

Gerhard Cless, and Edward L. Kaplan, both of Northbrook, Ill., assignors to Extel Corporation, Northbrook, Ill.

Division of Ser. No. 485,906, July 5, 1974. This application Dec. 8, 1975, Ser. No. 639,000
Int. Cl.² G06K *1/10*
U.S. Cl. 234—115 **8 Claims**

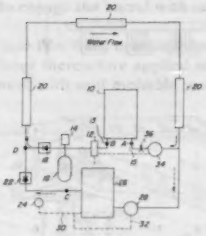


1. In a cyclically operable tape punch machine, punches selectable for operation, means to operate the selected punches, interposer slides moveable between a retracted and actuated position for selecting the punches, means including an electromagnetic means operable by an operating voltage of predetermined value to move an interposer from restored to actuated position in a cycle of the machine when its punch is to be operated and means to apply a reduced holding voltage to the electromagnetic means merely to hold an interposer in actuated position when that interposer is to be active in a cycle following the cycle in which it was actuated.

4,019,677
HEATING SYSTEM FOR BUILDING STRUCTURES

Anton A. Dotschkal, R.D. 2 Fairville Road, and James J. Massaro, R.D. 2 Desmith Road, both of Newark, N.Y. 14513

Filed June 4, 1976, Ser. No. 693,106
Int. Cl.² F24B *9/04*
U.S. Cl. 236—9 A **9 Claims**



1. A heating system for a building structure comprising in combination:

a. a first heating unit comprising a fireplace;
b. a heat exchange coil having an inlet and an outlet for a heating medium situated within said fireplace;
c. a first pumping means in fluid conducting relationship with the inlet of said heat exchange coil;
d. first control means for sensing the temperature of the heating medium at the outlet of said heat exchange coil and for activating and deactivating said first pumping means responsive to the sensed temperature;
e. a first flow control means in fluid conducting relationship with the outlet of said heat exchange coil for controlling the direction of flow of the heating medium;
f. a second heating unit having an inlet and outlet for heating said medium;
g. second pumping means in fluid conducting relationship with the inlet of said second heating unit;
h. second control means for sensing the ambient temperature within the building structure and activating or deactivating said second heating unit and said second pumping means responsive to the sensed temperature;
i. second flow control means in fluid conducting relationship with the outlet of said second heating unit for controlling the direction of flow of the heating medium; and
j. heat radiation means in fluid conducting relationship with said first and second flow control means and said first and second pumping means.

4,019,678
MIXING VALVE

Thomas J. Lord, Dayton, Ohio, assignor to United Aircraft Products, Inc., Dayton, Ohio

Continuation of Ser. No. 479,794, June 17, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,779
Int. Cl.² G05D *23/13*
U.S. Cl. 236—12 A **4 Claims**

1. A mixing valve device, including:

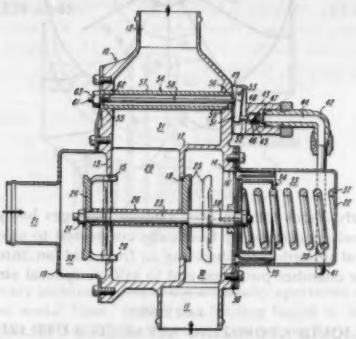
a. a body having spaced apart interior walls defining on opposite sides thereof inlet chambers and between them a mixing chamber opening into an outlet chamber,
b. said body having an end wall cooperating with one of said interior walls in defining one of said inlet chambers,
c. said interior walls and said end wall having aligned apertures,
d. a guide plate fixed to said body in a superposing relation to said end wall aperture,
e. a valve shaft axially adjustable in said body and valve plates on said shaft movable into and out of closing relation to respective apertures in said spaced apart interior walls responsive to axial adjustment of said shaft,
f. said valve shaft having spaced apart bearings in said body

including a bearing for one end thereof in said guide plate, said one end of said valve shaft projecting through and beyond said guide plate,

g. means forming a piston chamber into which said one end of said valve shaft projects, said piston chamber having a closed end and an open end the latter communicating through said guide plate with said one inlet chamber,

h. piston means in said piston chamber attached to said one end of said valve shaft and defining at one end with the closed end of said piston chamber a pressure chamber and exposed at the other end to the fluid pressure existing in said one inlet chamber,

i. a restricted flow passage in said valve shaft having entrance and exit ends on respectively opposite sides of said piston means and delivering fluid from said one inlet chamber to said pressure chamber at a uniform rate,



j. means defining a relatively unrestricted vent passage from said pressure chamber,

k. spring means urging said piston means in a direction away from the closed end of said piston chamber,

l. means sensing a changing temperature of mixed fluids reaching said outlet chamber,

m. means utilizing temperature changes as sensed by said sensing means to control the escape of fluid from said pressure chamber by way of said vent passage to vary the pressure in said pressure chamber and thereby to induce changes in the axial position of adjustment of said valve shaft,

n. and said body providing inlets to said inlet chambers and an outlet from said outlet chamber.

4,019,679

THERMOSTATICALLY CONTROLLED HEATING ARRANGEMENT INCLUDING A HEAT PUMP

Alfred Vogt, Schaan, Liechtenstein, and Herbert Bolter, Bludenz, Austria, assignors to Interliz Anstalt, Vaduz, Liechtenstein

Filed Dec. 15, 1975, Ser. No. 640,579

Claims priority, application Austria, Dec. 20, 1974, 10244/74

Int. Cl.² G05D *23/00*

U.S. Cl. 237—2 B **8 Claims**

1. A heating arrangement comprising:

a. a heat pump including

1. a condenser,

2. an expansion nozzle,

3. an evaporator, and

4. compressor means for compressing and thereby liquefying a volatile first heat transfer medium, for sequentially driving said medium through said condenser, said expansion nozzle, and said evaporator, and for receiving the medium evaporated in said evaporator,

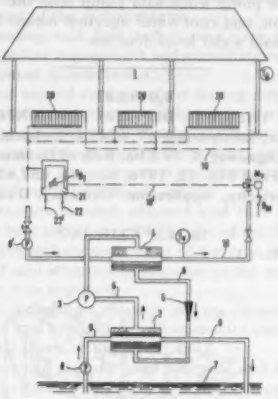
i. said compressor means including a plurality of individually driven pumping units connected in parallel between said evaporator and said condenser;

b. a heating circuit including

1. heater means for heating an area,

2. circulating means for circulating a second heat transfer medium through said condenser and said heater means for heat transfer between said first heat transfer medium and said area,

3. first temperature sensing means for sensing the ambient outdoor temperature outside of said area, and



4. second temperature sensing means for sensing the temperature of said second heat transfer medium circulated by said circulating means; and

c. control means operatively connected to said first and second temperature sensing means and to said compressor means for increasing and decreasing the number of driven pumping units in said compressor means in response to increases and decreases respectively in the difference of the temperatures respectively sensed by said first and second temperature sensing means.

4,019,680

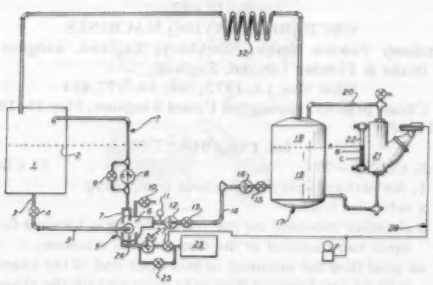
STEAM GENERATING SYSTEM INCLUDING MEANS FOR REINITIATING THE OPERATION OF A STEAM BOUND BOILER FEED PUMP

Orlin R. Norris, 36 Reservoir Road, Parsippany, N.J. 07054

Continuation-in-part of Ser. No. 512,498, Oct. 7, 1974, Pat. No. 3,940,058. This application Nov. 24, 1975, Ser. No. 634,817

Int. Cl.² F24D *1/02*

U.S. Cl. 237—9 R **9 Claims**



1. An improved steam boiler system comprising:

a steam boiler including a water level detector for detecting the level of water in said boiler;

a centrifugal pump for pumping water into said boiler, said pump having a low pressure input side and a high pressure output side;

a boiler feed water line connecting said pump to said boiler;
a condensate tank for supplying water to said centrifugal pump;
a suction line connecting said condensate tank to said pump;
a heating system for passing steam from said boiler back to said condensate tank; and,
an automatic cool water injection means for injecting water into said pump when said pump is in the steam bound condition, said cool water injection means being responsive to said water level detector.

4,019,681

THERMAL DISTRIBUTING UNIT

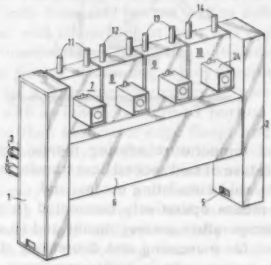
Josef Dumser, Jakobstrasse 47, 6745 Offenbach, and Wilhelm Korner, Logauweg 3, 79 Ulm, both of Germany

Filed Feb. 12, 1976, Ser. No. 657,628

Claims priority, application Germany, Feb. 19, 1975, 2507044

Int. Cl.² F24D *3/02*

U.S. Cl. 237—63 **13 Claims**



1. A thermal distributing unit comprising a first structure carrying main supply and return connections for a thermal working fluid, a second structure carrying an electrical connection for receiving electric power from an external power source, and an intermediate structure extending between and connected to the first and second structures, which intermediate structure carries a plurality of branch connections communicating with said main supply connection for distributing said thermal working fluid from the main supply connection to remote locations and carries a plurality of branch return connections communicating with said main return connection for the return of the working fluid to the main return connection.

4,019,682

ORCHARD SPRAYING MACHINES

Anthony Pawson Smith, Stockbury, England, assignor to Drake & Fletcher Limited, England

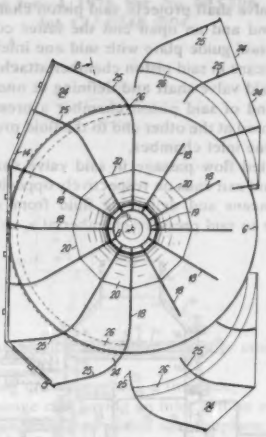
Filed May 14, 1975, Ser. No. 577,454

Claims priority, application United Kingdom, May 16, 1974, 21789/74

Int. Cl.² A01N *17/08*

U.S. Cl. 239—77 **11 Claims**

1. An orchard spraying machine comprising:
a vehicular frame;
a chamber mounted on the frame having a forward-facing open end disposed at the front of said machine;
an axial flow fan mounted in said open end of the chamber with its axis horizontal so as to draw air into the chamber through said open end;
a plurality of peripheral air outlets in the chamber disposed substantially radially of the fan axis and spaced rearwardly of the fan;
spray material supply means for discharging material to be sprayed into the air streams passing through said outlets; and
means dividing the chamber downstream of the fan, said chamber having a diameter substantially corresponding to the diametrical extent of the fan blades, into a plurality of discrete, axially extending air passages spaced angularly about the fan axis, said air passages being respectively continuously fluidically connected to said peripheral air outlets for directing air from said fan, through said air chamber passages, and to said peripheral air outlets.



4,019,683

LIQUID ATOMIZING APPARATUS UTILIZING ULTRASONIC WAVE

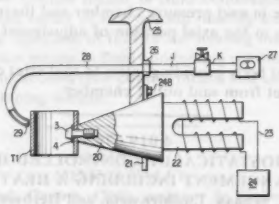
Kiyokazu Asai, and Akihiro Takeuchi, both of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

Filed Sept. 30, 1975, Ser. No. 618,235

Claims priority, application Japan, Sept. 30, 1974, 49-113149

Int. Cl.² B05B *17/06*

U.S. Cl. 239—102 **36 Claims**



1. A liquid atomizing apparatus comprising:
an ultrasonic wave oscillator;
an ultrasonic wave transducer connected to said ultrasonic wave oscillator for transforming an electrical oscillation of said oscillator into a mechanical vibration;
a mechanical vibration amplifying member integrally connected to one end of said ultrasonic wave transducer for amplifying the amplitude of said mechanical vibration transmitted from said ultrasonic wave transducer;
an ultrasonic vibratory member of a hollow annular body being open at both ends thereof, being circular in radial cross-section, having a predetermined length between said ends thereof, having a predetermined wall thickness which is constant in the axial direction of said annular body, and being integrally connected, at an outer circumferential side wall portion thereof, to the output end of said mechanical vibration amplifying member with the axis thereof being disposed perpendicular to the axis of said mechanical vibration amplifying member; and

liquid supply means connected to a liquid source for supplying a predetermined amount of liquid to at least one of the outer and inner circumferential surfaces of said ultrasonic vibratory member,

whereby said liquid supplied to said circumferential surface of said ultrasonic vibratory member upon said circumferential surface of said ultrasonic vibratory member may be atomized as a result of the ultrasonic vibration thereof.

4,019,684

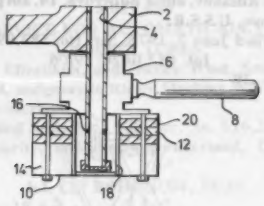
ATOMIZER

Charles Stephen Parkin, Potterspury, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 561,443, March 24, 1975, abandoned. This application Mar. 11, 1976, Ser. No. 666,119

Int. Cl.² A01G *27/00*

U.S. Cl. 239—145 **11 Claims**



1. A rotary atomiser comprising an axially apertured disc of reticulated metal foam, means for feeding liquid to be atomised to the surface of the aperture, and means for rotating the disc at such speeds that the liquid to be atomised travels radially through the disc and is atomised at the outer surface thereof.

4,019,685

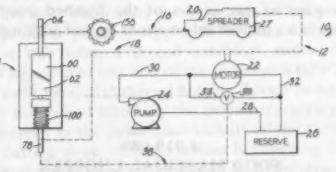
APPARATUS FOR SYNCHRONIZING THE SPEED OF A MATERIAL SPREADER OR THE LIKE WITH THE SPEED OF A VEHICLE UPON WHICH IT IS MOUNTED

Lawrence N. Tangeman, Beatrice, and Arthur Linsenmeyer, Wymore, both of Nebr., assignors to Dempster Industries, Inc., Beatrice, Nebr.

Filed Oct. 31, 1975, Ser. No. 627,676

Int. Cl.² B05B *9/06*

U.S. Cl. 239—156 **8 Claims**



1. Apparatus for evenly spreading material from a spreader vehicle having mobilizing means including ground-engaging wheel means, said apparatus comprising:

selectively actuatable, variable output spreading means for spreading said material during travel of said vehicle and including hydraulic motor means and material-dispensing apparatus coupled to the motor means;

means for controlling the output of said spreading means for ensuring substantially even application of said material onto a field or the like during travel of the vehicle at constant and varying speeds, including:

a first rotatable cam member;

means operatively coupling said first cam member and said mobilizing means of said vehicle for rotation of the first cam member in response to travel of the vehicle and at a rotational speed related to and varying in general correspondence with the travel speed of said vehicle;

a second rotatable cam member;

means operatively coupling said second cam member and said motor means of said spreading means for rotation of the second cam member in response to the operation of said motor means and at a rotational speed and related to and varying in general correspondence with the operational speed of the motor means;

means mounting said first and second cam members in biased-together engagement and permitting relative shifting movement therebetween,

said first and second cam members having respective, oblique engagement surfaces and being cooperatively configured for causing variable relative shifting movement therebetween while remaining in at least partial engagement when the respective cam members are rotated at varying differential rotational speeds;

shiftable structure located adjacent said first and second cam members and engageable by one of the latter during said relative shifting movement of the cam members for shifting of said structure in response to the relative shifting of the cam members;

valve means including a movable valving element operably coupled to said hydraulic motor means for controlling the operational speed of the latter; and

means connecting said shiftable structure and said valving element for movement of the element in response to said shifting of the shiftable structure for regulating the amount of hydraulic fluid delivered to the motor means to thereby control the output of the material-dispensing apparatus and to coordinate said output with vehicle speed.

4,019,686

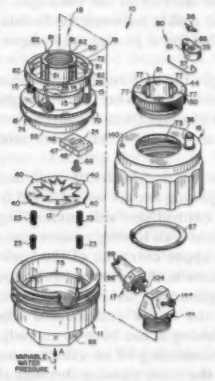
WATER SPRINKLER OPERATED BY REGULARLY VARYING WATER PRESSURE

Florencio Neto Palma, 263 Keele St., Toronto, Ontario, Canada

Filed May 27, 1975, Ser. No. 580,922

Int. Cl.² B05B *1/30, 3/06, 15/10*

U.S. Cl. 239—205 **4 Claims**



1. A water sprinkler having an inlet connected to a source of water varying with regular pulses of pressure from a preset maximum to a preset minimum, comprising in combination;

a head movably contained within a cap and a base, said inlet being connected to said base to introduce water therein, said head being hollow with a solid bottom having a window opening therethrough;

a plate having particularly shaped pattern cut therefrom positioned between said base and said bottom of said head, said opening serving to restrict the passage of water into said head thereby decoding said pattern into a variable volume of water passing into said head;

spring means adapted to provide a torque to said head within said cavity in reaction to a maximum pulse of the water pressure on the bottom of said head; means for preventing the head from returning to its untorqued position in said cavity upon reduction of said pressure to said minimum and action of said spring means returning said head to an extended position within said cavity, thereby to provide a stepping of said opening in said bottom over said pattern;

and a water nozzle outlet in said head for distributing a varying flow and throw of water in step with the variation of segmented portions of the pattern.

4,019,687

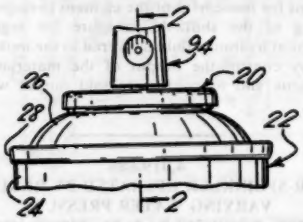
AEROSOL VALVE AND SPRAYHEAD

Edward H. Green, 11 Army Trail Road, Addison, Ill. 60101

Continuation of Ser. No. 304,695, Oct. 8, 1972, abandoned, which is a continuation of Ser. No. 122,935, March 10, 1971, abandoned. This application Mar. 21, 1975, Ser. No. 560,877

Int. Cl.² B05B *1/30*

U.S. Cl. 239—573 **8 Claims**



1. A valve structure for a pressurized package, comprising:

A. a cover member adapted to be installed in said package,

B. a housing connected to the bottom of the cover member and being enclosed but for a first opening through the cover member and a second opening adapted to communicate with the interior of the package,

C. an elastomeric gasket between the housing and the cover member and having a passageway aligned with the first opening,

D. a valve plunger in the housing spring-biased against the elastomeric gasket and when so biased blocking passage of pressurized product from the interior of the housing to the exterior of the cover member, said valve plunger comprising

1. a body having a cylindrical wall defining a central upwardly opening socket with a blind bottom floor and including a central upwardly extending center post,

2. the cylindrical wall having a valve seat at its upper end around the upper entrance of the socket,

3. channel means in the interior of the socket in said wall extending generally axially of the cylindrical wall, opening at the upper end thereof adjacent the valve seat and opening at the bottom end adjacent said floor,

E. a sprayhead consisting of an exterior push button and a hollow stem, the stem passing through the first opening and the passageway of the elastomeric gasket in a sealing and sliding engagement and having the exterior of the wall thereof sealingly engaged in said socket and extending substantially to the bottom floor thereof, the lower part of said stem wall being imperforate and having an axial end opening, and

F. the lower end of the socket having means providing passage from the bottom end of said channel to the axial end opening of the stem,

the pressurized product adapted to be conveyed from the interior of the housing over the valve seat when the push button is depressed and then to pass by way of said channel means to the bore of the stem and thence out to the atmosphere by way of said push button, said push button having an external orifice communicating with said bore.

4,019,688

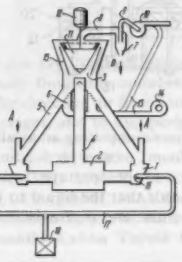
DEVICE FOR TREATING LOOSE MATERIALS

Viktor Ivanovich Akunov, Nagatinskaya ulitsa, 83, korpus 2, kv. 420; Ivan Timofeevich Blinov, Kutuzovsky prospekt, 30/32, kv. 801; Viktor Fedorovich Boryakov, Begovaya alleya, 3, kv. 198; Nikolai Evgenievich Ermolaev, Vostochnaya ulitsa, 1/7, korpus 4, kv. 68; Georgy Vladimirovich Zavadsky, Rizhsky proezd, 7, kv. 79; Vladimir Viktorovich Lopatin, prospekt Vernadskogo, 61, kv. 19, and Gennady Fedorovich Rusakov, ulitsa Butlerova, 14, korpus 2, kv. 205, all of Moscow, U.S.S.R.

Filed June 2, 1975, Ser. No. 583,093

Int. Cl.² B02C *19/06*

U.S. Cl. 241—39 **1 Claim**



1. A device for treating loose material in counterflow, comprising: a chamber defined in a housing; injectors built in said chamber and directed toward each other; a main separator including a central rotor communicating with said chamber and said injectors; pipelines through which said separator is connected to said injectors; additional separators for withdrawing a fraction of the finished product that remains in the material to be returned into said injectors for additional treatment, said additional separators being built in at least one of said pipelines; and a cone-shaped hollow member accommodated in said main separator about said rotor thereof to prevent the gaseous suspension of the finished product being withdrawn in an undesirable manner by said additional separators.

4,019,689

FOOD MATERIAL CHOPPER

William Joseph Hunt, London, England, assignor to Beed (Dishwashers) Limited, Ipswich, England

Filed Oct. 15, 1975, Ser. No. 622,461

Claims priority, application United Kingdom, Oct. 18, 1974, 4554/74

Int. Cl.² B02C *18/18*

U.S. Cl. 241—282.1 **12 Claims**

1. A chopper unit for chopping food material, the unit comprising a shaft arranged to receive a rotational drive at one end, cutter blade means secured to said shaft at the other end thereof, a generally tubular member rotatably mounting said shaft and extending towards said cutter blade means, a ring supported by said tubular member so as to surround said cutter blade means, the ring having a cutting edge extending around at least the major part of the periphery of the area

swept by said cutter blade means at a position longitudinally of said shaft beyond said cutter blade means, and at least one

aperture for chopped food material between said ring and said tubular member supporting said ring.

4,019,690

WINDING DEVICE FOR AUTOMATICALLY CHANGING BOBBIN TUBES

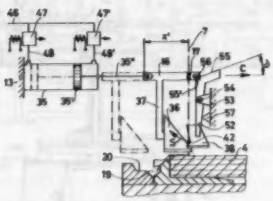
Gujer Peter, Effretikon, and Olivier Wust, Seuzach, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Sept. 24, 1975, Ser. No. 616,253

Claims priority, application Switzerland, Oct. 4, 1974, 13360/74

Int. Cl.² B65H *67/04, 54/34*

U.S. Cl. 242—18 A **9 Claims**



1. A winding device for automatically changing tubes for takin-up endless threads or the like, said winding device being provided with a thread traversing device for generating thread winding wraps, a thread deflecting device for lifting the thread off the thread traversing device, a thread holding device provided with a thread guiding device for guiding the thread in its lifted-off position during the change of the bobbin tube, a drive drum, and at least two bobbin chucks driven by said drive drum and alternately brought into a bobbin or tube change position respectively, each of said bobbin chucks supporting one tube, a thread catching- and cutting zone arranged adjacent to one end of the associated tube and rotating with such tube, said thread holding device being arranged such that the thread lifted off the thread traversing device is guided thereby in the immediate vicinity of the thread catching and cutting zone, shifting means for shifting the thread holding device and thereby the thread in a first thread shifting step from a position at the immediate vicinity of the thread catching- and cutting zone through such zone and onto an end portion of the tube adjacent thereto, and which shifting means in a second thread shifting step shifts the thread over a predetermined distance on such tube for creating reserve wraps, said shifting means shifting the thread at a higher shifting speed during the second step than during the first step, said shifting means comprising a substantially linearly movable drive element movable in a direction substantially parallel to the lengthwise axis of the associated bobbin chuck, said drive element being connected with the thread holding device, a first thread guide element provided with a thread guide notch for taking-up the thread after the latter has moved over a distance corresponding to the first thread shifting step, means for mounting said first thread guide element, a second thread guide element connected with the thread holding device at a location between the drive element and the thread guiding device of the thread holding device, said second thread guide element being provided with a thread guide surface arranged at an inclination with regard to the direction of movement of the thread holding device such that said thread guide surface, during such time as the thread holding device moves over a distance corresponding to the second shifting step, shifts the thread along a side surface of said thread guide notch of the first thread guide element and immediately prior to completion of the second shifting step shifts the thread over an end of such side surface, the improvement comprising:

said means for mounting the first thread guide element including means for arranging said first guide element to be movable in a direction of the thread shifting movement in a manner such that at least one additional shifting step is performed between the first and second shifting steps and which additional shifting step is directed opposite to said first and second shifting steps.

4,019,691

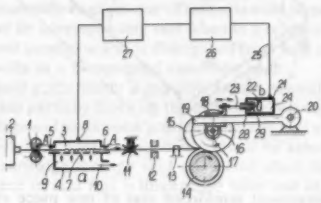
METHOD AND APPARATUS FOR WINDING YARN ONTO A CROSS-AND-CONE WOUND BOBBIN

Zbigniew Wroclawski; Stanislaw Kedzia, and Tadeusz Pawlowski, all of Lodz, Poland, assignors to Centralny Osrodek Badawxzorozwojowy Maszyn Wlokienniczych "Centamatex", Lodz, Poland

Filed Nov. 10, 1975, Ser. No. 630,648

Int. Cl.² B65H *59/38*

U.S. Cl. 242—45 **8 Claims**

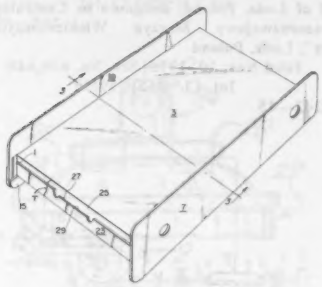


1. A method of winding yarn fed at a constant speed from a work station onto a conical shaft to form a cross-and-cone wound bobbin, said method comprising driving the bobbin by frictional contact thereof with a drive element driving said drive element around an axis of rotation which is inclined at an acute angle with the axis of rotation of the bobbin such that the frictional contact of the bobbin with the drive element is at a point along a generating line of the bobbin cone, passing the yarn from the work station to the bobbin through a transit receptacle where the yarn is temporarily accumulated, measuring the degree of filling the yarn in the receptacle, and varying the winding speed of the bobbin to compensate for the varying diameters of the bobbin while keeping a constant feed of the yarn by displacing the bobbin cone to change the position of the contact point of the drive element along the generating line of the bobbin cone in response to the measured degree of filling of the yarn in the receptacle to maintain a substantially constant degree of filling therein.

3. Apparatus for winding yarn fed at a constant speed from a work station as a cross-and-cone wound bobbin, said apparatus comprising a pair of yarn take-up shafts for feeding yarn at a constant speed, a vacuum receptacle for receiving the yarn and temporarily accumulating the yarn therein, said receptacle comprising a holding chamber through which the yarn travels, a suction chamber and a wall separating the holding chamber and the suction chamber, said wall having two rows of yarn laying parts for forming loops of yarn due to suction in the holding chamber, means for measuring the degree of filling of said yarn in said holding chamber, a conical drive shaft, a conical support shaft for receiving yarn from the holding chamber and for winding the yarn on the support

shaft, said shafts having axes which are inclined at an acute angle relative to one another, said drive shaft being in peripheral contact with said yarn wound on the support shaft at a point along the generating line of the conically wound bobbin to drive the bobbin in rotation, and control means for displacing said conical shaft relative to said drive shaft to vary the position of the contact point of the drive element along the generating line of the conically wound bobbin to compensate for varying winding diameters of the conical bobbin while keeping a constant feed of the yarn, said control means being coupled to said means which measures the degree of filling of the yarn in said holding chamber to maintain said degree of filling substantially constant by varying said position of said contact point.

4,019,692
REINFORCED REEL
Wallace E. Hanson, Hampden, Mass., assignor to Champion International Corporation, Stamford, Conn.
Filed Dec. 18, 1975, Ser. No. 641,726
Int. Cl.² B65H *75/14*
U.S. Cl. 242—71.8 **13 Claims**



1. An improved reinforced reel of one piece of foldable material with an outside surface and an inside surface comprising:

first and second outer side panels each shaped like the intended reel flange and having said outside surface facing outwardly of the reel and said inside surface facing inwardly of the reel, said panels being arranged in spaced apart substantially parallel reltionship relative to each other;

first and second major reinforcing panels of the same configuration as said outer side panels;

said first and second major reinforcing panels hingedly connected to one side of each of the outer side panels and folded against and secured to the inside surface of said outer side panels;

a first minor reinforcing panel being hingedly connected to the opposite side of, reversely folded against the inside surface of, and secured to said first major reinforcing panel; said first minor reinforcing panel being of a size and shape to cover a major area of the inside surface of said first outer side panel and said first major reinforcing panel;

first and second hub panels arranged in respective substantially parallel planes which are substantially perpendicular to the planes in which said outer side panels are disposed, said hub panels both located between said outer side panels and spacing apart the outside panels and their respective reinforced panels;

said second hub panel being hingedly connected on one edge to the other edge of the first minor reinforcing panel;

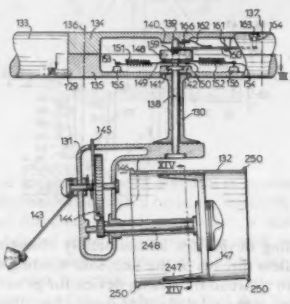
a glue panel hingedly connected by its opposite sides between said first hub panel and said first outer side panel, respectively, and reversely folded against and secured into surface to surface contact with said first minor reinforcing panel;

an anchor reinforcing panel hingedly connected to said first hub panel on the edge opposite said glue panel and positioned adjacent to and secured to said second major reinforcement panel when the latter is in its folded position; said anchor reinforcing panel being of a size and shape to cover a major area of the inside surface of said second outer side panel and said second major reinforcing panel; and

a second minor reinforcement panel being hingedly connected between and to the other side of said second hub panel and said second outer side panel and folded to lie in contact with said anchor panel when said anchor panel is adhered to said second major reinforcement panel;

whereby each outer side panel is reinforced over a major portion of its surface area by at least three plies of material.

4,019,693
FISHING REEL
Jean Lesage, 37 rue Le Campion, 50 Granville, France
Filed Dec. 2, 1974, Ser. No. 528,929
Claims priority, application France, Dec. 10, 1973, 73.43926; Oct. 11, 1974, 74.34270
Int. Cl.² A01K *89/015*
U.S. Cl. 242—84.2 B **7 Claims**



1. A fishing reel apparatus comprising, in combination:

an elongated foot for attachment of the reel apparatus to a fishing rod extending parallel to the direction of elongation of the foot;

a spool;

a crank handle and means connecting said handle and said spool together for revolving said spool;

a support having a mounting for said spool allowing said spool to revolve relative to said support;

a bushing mounted externally of said foot and interposed between said foot and said spool support;

a disk mounted within said foot;

a rotatable shaft fixedly attached to said disk and to the spool support and extending through said bushing;

a pair of helicoidal springs for elastically urging said disk towards a predetermined relative angular position thereof, being arranged symmetrically with respect to said foot and each having a first end and a second end respectively attached to said foot and to said disk;

said disk having a first off-center opening and a second circumferentially elongated off-center opening at a mutual circumferential offset of substantially 90°, **as measured between centers;**

a control device for selectively indexing the relative angular position of said disk, comprising a lever bearing at one end a control button and at the other end a pin capable of engaging either of said openings and arranged to engage

said first opening snugly and to engage said elongated opening with allowance of a limited amount of play;

said disk being affixed to said shaft with an orientation such that said pin is caused to engage in said elongated opening when the axis of said spool is approximately perpendicular to the longitudinal direction of said foot, and

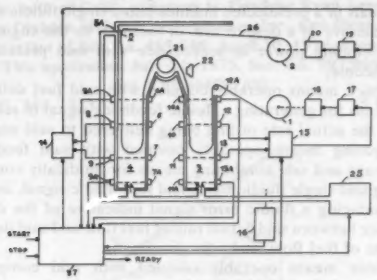
a stop member provided on said foot for limiting the rotation of said disk, shaft and spool support to substantially a single quadrant plus an allowance for said play to enable the spool axis to swing in response to cranking forces, said disk having a peripheral groove into which said stop member projects.

4,019,694

SEMIAUTOMATIC LOADING OF TAPE TRANSPORTS

Carlo Fare, and Francesco De Bartolomeis, both of Milan, Italy, assignors to Honeywell Information Systems Italia, Milan, Italy

Filed Dec. 15, 1975, Ser. No. 641,125
Claims priority, application Italy, Dec. 20, 1974, 30808/74
Int. Cl.² G11B 15/66, 15/58
U.S. Cl. 242—182 6 Claims



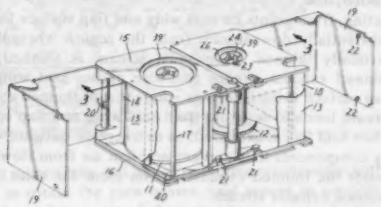
1. In a tape transport of the type using capstan means for selectively moving tape past a recording/readout station, said capstan means and said station being located in an enclosed compartment of said transport, a pair of tape reels rotatably supported externally of said compartment and selectively adapted to dispense or receive said tape traveling therebetween, means for manually inserting said tape into a first tape path extending from said reels into said compartment and conforming to a predetermined configuration imposed by the structure of said compartment, means for disabling the operation of said transport in the absence of predetermined operating conditions, means selectively actuated for automatically shifting said tape within said compartment in sequential steps from said first path into a second tape path, said second path extending between said reels and placing said tape into position for recording/readout operation, means for at least partially inhibiting said disabling means during the tape shifting operation, a pair of loop chambers located in said compartment each adapted to accept a tape loop when said tape is disposed in said second path, said capstan means being positioned in said second path substantially symmetrically with respect to said pair of loop chambers, means for applying vacuum pressure to said loop chambers to facilitate the formation of said tape loops under tension said apparatus further including an internal guide surface in a defined region of said compartment spaced from said capstan means and said loop chambers respectively and means for applying vacuum pressure to said defined region to conform said tape to said internal guide surface, said internal guide surface substantially constituting an extension of a tape contacting wall of one of said loop chambers, said surface deflecting said second tape path between said last recited loop chamber and one of said tape reels.

4,019,695

TAPE CARTRIDGE WITH MOVABLE GUIDE MEMBER

John L. Wharam, Eagan, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 28, 1976, Ser. No. 680,902
Int. Cl.² G03B 1/04; G11B 15/32
U.S. Cl. 242—199 2 Claims



1. A video tape cartridge for housing a pair of spaced apart tape reels in parallel relationship to each other, which cartridge includes a fixed portion with a rectangularly shaped main wall and two parallel rectangularly shaped sidewalls that protrude from opposite side edges of said main wall for semi-permanently journaling said reels in said housing, two L-shaped doors that are hingedly connected at one end to the other of the opposite side edges of said base wall, and guide means disposed between said sidewalls at opposite ends of said housing for holding tape on said reels in a proper position for engagement with a record/reproduce apparatus, said cartridge characterized by the feature that:

each of said reels includes a spring loaded bearing member that normally engages one of said sidewalls to support one end of its corresponding reel when in a relatively uncompressed condition and is disengaged from said one of said sidewalls in a compressed condition; and

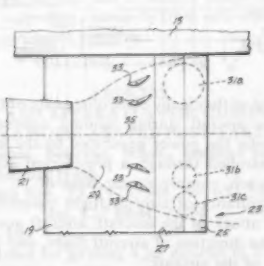
one of said guide means is movable from a normal operating position partially blocking the end of the housing in which it is disposed to an open position whereby said end is open to permit at least one of said reels to be removed from said cartridge through said open end when the bearing member of said reel is disengaged from one of said sidewalls.

4,019,696

METHOD OF AND APPARATUS FOR ENHANCING COANDA FLOW ATTACHMENT OVER A WING AND FLAP SURFACE

William J. Hirt, Bellevue, and Charles A. Grotz, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 429,657, Dec. 28, 1973, abandoned.
This application Aug. 28, 1975, Ser. No. 608,667
Int. Cl.² B64C 21/00
U.S. Cl. 244—42 CD 14 Claims



1. A method of providing enhanced Coanda flow attachment to the upper wing and flap surface of an upper surface blowing aircraft wherein a jet engine exhaust stream passes

over said upper wing and flap surface, said method comprising the steps of:

vertically thinning said jet exhaust stream, prior to said exhaust stream passing over said upper wing and flap surface in a manner such that a downward thrust component, adapted to augment the aerodynamic lift of said wing, occurs when the flap portion of said wing is extended; and,

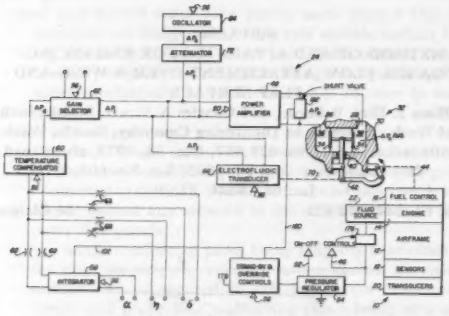
directing, from points on said wing and flap surface located substantially downstream from the region whereat said vertically thinned jet exhaust stream is thinned, said thinned exhaust stream spanwise across said wing and flap surface toward regions whereat said thinned exhaust stream tends to separate from said wing and flap surface when said flap is extended, so as to create outward velocity components that prevent ambient air from flowing in under the thinned exhaust stream from the sides of the thinned exhaust stream.

3. In an upper surface blowing type aircraft wherein the exhaust stream of a jet engine is vertically thinned when a flap of an associated wing and flap structure is extended, and the thinned exhaust stream is directed to flow over said wing and flap surface, said thinned exhaust stream adhering to said wing and flap surface when said flap is so extended in a manner such that a downward thrust component, adapted to augment the aerodynamic lift of said wing, occurs when said flap is extended, the improvement comprising horizontal, spanwise directing means, mounted in said thinned exhaust stream and on said wing and flap surface substantially downstream of the region whereat said thinned exhaust stream is thinned for horizontally directing a portion of said thinned exhaust stream spanwise toward regions whereat said thinned exhaust stream tends to separate from said wing and flap surface.

4,019,697
FLUIDIC APPROACH POWER COMPENSATOR CONTROL SYSTEM

Thomas B. Tippetts, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Aug. 25, 1975, Ser. No. 607,530
Int. Cl.² B64D *37/00*
U.S. Cl. 244—78 **44 Claims**



1. A method of fluidically controlling rate of fuel flow to the engine of an aircraft during landing approach operation thereof whereby the power generated by the engine is automatically controlled through a preselected schedule during landing approach, comprising the steps of:

sensing a plurality of aircraft flight parameters including angle of attack of the aircraft, aircraft acceleration normal to the direction of aircraft flight, and position of the elevator of the aircraft;

generating fluidic parameter signals in relation to said sensed parameters;

fluidically combining said fluid parameter signals in a preselected manner into a single fluid signal indicative of a desired rate of fuel flow to the aircraft engine for developing power in accordance with said preselected schedule;

generating a fluidic feedback signal in relation to the actual rate of fuel flow being delivered to said engine;

fluidically comparing said signal fluid signal and said fluidic feedback signal and producing a fluidic error signal indicative of the difference said actual rate of fuel flow and said desired rate of fuel flow; and

adjusting said actual rate of fuel flow in relation to said fluidic error signal whereby said engine develops power in accordance with said preselected schedule.

12. Apparatus for fluidically controlling adjustable fuel delivery means which supply fuel flow to the engine of an aircraft during landing approach operation thereof whereby the power generated by the engine is automatically controlled through a preselected schedule during landing approach, comprising:

sensing means for sensing a plurality of aircraft flight parameters including angle of attack of the aircraft, aircraft acceleration normal to the direction of flight thereof, and position of the elevator of the aircraft;

generating means operably coupled with said sensing means for generating fluidic parameter signals in relation to said sensed parameters;

combining means operably coupled with said generating means for fluidically combining said fluidic parameter signals in a preselected manner into a single fluidic signal indicative of a desired rate of fuel flow to the engine for developing power in accordance with said preselected schedule;

feedback means operably coupled with said fuel deliverly means for generating a fluidic feedback signal in relation to the actual rate of fuel being delivered to said engine;

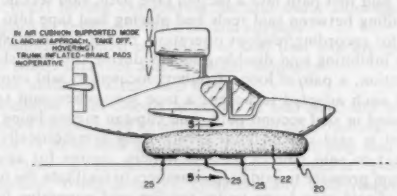
comparing means operably coupled with said feedback means and said combining means for fluidically comparing said single fluidic signal and said fluidic signal, and for producing a fluidic error signal indicative of the difference between said actual rate of fuel flow and said desired rate of fuel flow; and

actuator means operably coupled with said comparing means and said fuel deliverly means for adjusting said fuel delivery means to alter said actual rate of fuel flow in relation to said fluidic error signal whereby said engine develops power in accordance with said preselected schedule.

4,019,698
AIR CUSHION UNDERCARRIAGE BRAKE SYSTEM

T. Desmond Earl, Buffalo, N.Y., assignor to Textron, Inc., Providence, R.I.

Filed Mar. 25, 1976, Ser. No. 670,258
Int. Cl.² B60V *3/08*; **B64C** *25/32*
U.S. Cl. 244—110 A **11 Claims**



1. In an aircraft, in combination;

an aircraft body having a bottom surface;

a flexible inflatable bag-like trunk formed of elastic sheet material circumscribing at least a portion of said bottom surface to define an air cushion space therebelow;

means for maintaining the interior of said trunk under superatmospheric air pressure to balloon it downwardly below said bottom surface of the body, said trunk when inflated having a footprint area;

means for supplying said air cushion space with air at a rate sufficient to elevate said aircraft from a reaction surface;

said trunk including brake means on said footprint area thereof for engaging the reaction surface;

said brake means comprising at least one brake unit including an elastomeric base plate portion affixed to the sheet material of said trunk externally thereof and having paired longitudinally parallel running friction brake shoes extending therefrom; and

actuation means under aircraft operator control for causing said brake unit and its associated portion of the trunk sheet to be elastically projected below the normal footprint area profile of said trunk device with said friction brake shoes deployed in unison for contact with a reaction surface;

whereby upon deactivation of said actuation means said elastically projected portions of said trunk sheet return to normal trunk inflation condition, and whereby upon deflation of said trunk said brake shoes assume paired pleat-folded relationships to accommodate elastic contractions of associated portions of said trunk sheet.

4,019,699

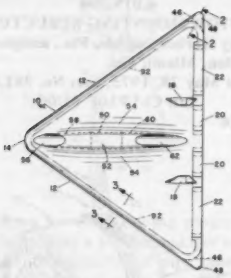
AIRCRAFT OF LOW OBSERVABILITY

Robert W. Wintersdorff, San Diego, and George R. Cota, La Jolla, both of Calif., assignors to Teledyne Ryan Aeronautical a Division of Teledyne Industries, Inc., San Diego, Calif.

Continuation of Ser. No. 465,540, April 30, 1974, abandoned. This application July 21, 1975, Ser. No. 597,969

Int. Cl.² B64D *7/00*

U.S. Cl. 244—121 **5 Claims**



1. An aircraft of low observability, comprising:

a wing having a nose portion, swept back leading edges extending from the nose portion, and a trailing edge, major portions of the edges being substantially straight in planform;

said wing having upper and lower surfaces, major portions of which are substantially flat;

the wing having rounded tips blending tangentially into said leading and trailing edges and having a radius of at least one quarter wavelength of the lowest frequency radar expected to be encountered;

extended aerodynamic tips of radar transparent material fixed to said rounded tips;

and all surfaces of the wing having substantially continuous electrical conductivity.

4,019,700

BEAM CREEL

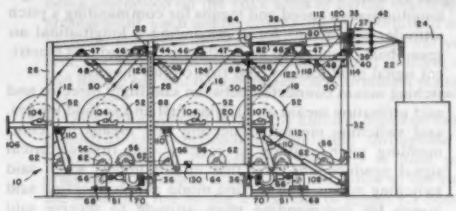
Herbert R. King, Spartanburg, Scotland, assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Dec. 3, 1975, Ser. No. 637,384

Int. Cl.² B65H *49/02;* **D02H** *1/00;* **D03J** *5/08*

U.S. Cl. 242—131.1 **8 Claims**

1. A creel to supply yarn to a yarn consuming machine comprising: a frame, means to rotate a plurality of yarn beams mounted in said frame, means to support a plurality of yarn beams operably associated with said frame, means to supply yarn from the yarn beams to the yarn consuming machine mounted on said frame and means to move said yarn beam



support means into and out of operative relationship with said means to rotate the yarn beams, said means to support yarn beams including a pair of elongated beams pivotally mounted in said creel.

4,019,701

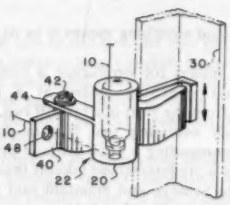
TENSION CONTROL

Robert W. McCullough, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Continuation of Ser. No. 507,510, Sept. 19, 1974, abandoned, which is a division of Ser. No. 403,174, Oct. 3, 1973, Pat. No. 3,905,210. This application Oct. 14, 1975, Ser. No. 621,858

Int. Cl.² B15H *59/10*

U.S. Cl. 242—152.1 **1 Claim**



1. Yarn tension control apparatus comprising: an elongated body member, a flange portion connected to said body member and extending outwardly and substantially perpendicular to said body member, a lip portion connected to said body member extending towards and closely adjacent said flange member to form an elongated narrow space between said body member and said lip portion to provide a space to slidably accommodate a structural member to which said apparatus is to be attached, said body member having an enlarged portion thereof spaced from said flange member and extending outwardly from said body portion in a direction opposite to said flange portion, a yarn tension control means connected to said enlarged portion and a second flange member connected to and extending outwardly from said enlarged portion to support a yarn guide member.

4,019,702

METHOD AND APPARATUS FOR GUIDING A JET AIRCRAFT IN A NOISE-ABATED POST-TAKEOFF CLIMB

Gordon D. Annin, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 13, 1975, Ser. No. 631,525

Int. Cl.² B64C *15/00*

U.S. Cl. 244—182 **13 Claims**

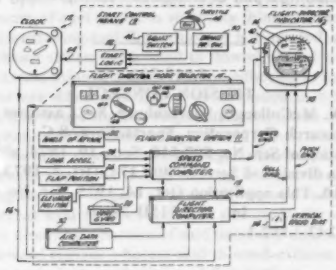
1. An apparatus for guiding a jet aircraft in a noise-abated post-takeoff climb, comprising:

a flight director having a first circuit means for producing a first electrical signal representing a difference between a sensed longitudinal air speed and a predetermined longi-

tudinal air speed, and having a second circuit means for producing a second electrical signal representing a difference between a sensed vertical speed and a predetermined vertical speed;

signal utilization means including means for commanding a longitudinal air speed and means for commanding a pitch attitude, said means for commanding a longitudinal air speed being connected and responsive to said first electrical signal produced by said first circuit means;

switching means connected between said flight director and said utilization means and having first and second modes, said switching means connecting said means for commanding pitch attitude to receive said first electrical signal produced by said first circuit means when said switching means is in its first mode and connecting said means for commanding pitch attitude to receive said second electrical signal produced by said second circuit



means when said switching means is in its second mode; and

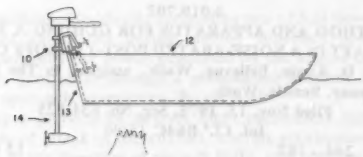
timing control means for producing a control signal for operating said switching means at a predetermined elapsed time from the start of a takeoff run, said switching means initially assuming said first mode so that said means for commanding a pitch attitude produces a command that for a predetermined takeoff thrust level causes the aircraft to achieve and maintain said predetermined longitudinal air speed, said switching means being responsive to said control signal to assume said second mode in which said means for commanding a pitch attitude now produces a command in accordance with said predetermined vertical air speed which at said predetermined longitudinal air speed as commanded by said means for commanding a longitudinal air speed requires a reduction in thrust to a level that is substantially less than said predetermined takeoff thrust level.

4,019,703

TROLLING MOTOR SAFETY MOUNT

Robert Wayne Meredith, 2518 Montreal Drive, and Norman B. McCreary, 45 Lakeshore Drive, both of Little Rock, Ark. 72204

Filed Mar. 17, 1976, Ser. No. 667,827
Int. Cl.² B63H *21/26, 21/30*
U.S. Cl. 248—4 **10 Claims**



1. Apparatus for mounting a trolling motor or the like to the stern section of a boat, said apparatus comprising

clamping means for releasable clamping engagement with the stern section of a boat,

a hollow mounting block having closed top and side walls thereof, and an open bottom end thereof, said mounting block having the proper dimensions to receive a mounting clamp for a trolling motor or the like thereon,

means for pivotally mounting said mounting block to said clamping means so that a motor clamped to said mounting block can be pivoted from a first position wherein it is in stable operating position in water in which the boat is disposed with the mounting block open end abutting a portion of said clamping means, to a second position wherein the motor is closer to the water's surface then in said first position and said open end of said mounting block does not abut a portion of said clamping means, to a third position wherein the motor is generally pivoted out of the water,

detent means located within the area defined by said hollow mounting block when said block is in said first position for releasably latching said mounting block in said first position so that the normal thrust of a motor mounted on said mounting block will not cause said mounting block to be pivoted to said second position, but so that should the motor on said mounting block strike an object that is underwater said mounting block will be moved to said second position, and so that after the underwater object is passed by the motor, the normal weight of the motor and the mounting block will move said mounting block back to said first position and cause said detent means to latch said mounting block in said first position, and

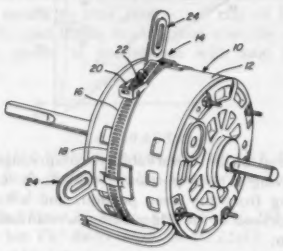
means separate from said detent means for locking said mounting block in said third position when manually moved to said third position.

4,019,704

MOTOR MOUNTING STRUCTURE

Fred Levine, Bay Harbor Islands, Fla., assignor to Acme Service Corporation, Miami, Fla.

Filed May 28, 1975, Ser. No. 581,688
Int. Cl.² F16F *15/00*
U.S. Cl. 248—16 **2 Claims**



1. A motor mounting bracket including a generally cylindrical adjustable circumference clamp-type band, at least two L-shaped brackets, each of said brackets including a pair of generally right angulated first and second elongated flanges integrally joined at one pair of adjacent ends, said first flange of each bracket having a mounting fastener opening formed therethrough and the second flange of each bracket including a central elongated longitudinally extending strip portion extending longitudinally thereof defined by and disposed between a pair of generally parallel longitudinal slits formed in said second flange, the opposite end portions of said strip portion being integral with the portions of said second flange disposed between the pairs of corresponding ends of said slits and said strip portion including a longitudinal central portion thereof extending between its opposite end portions laterally displaced outwardly of the side of said second flange defining one side of the included angle formed by said second flange and defining a flattened sleeve opening intermediate the opposite side edges of said second flange with said opening extend-

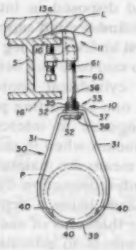
ing transversely of said second flange centrally intermediate the opposite end thereof and with one marginal portion of said sleeve opening coextensive with the surfaces of said second flange disposed outwardly of the remote sides of said slits and defining said one side of the included angle, said brackets being disposed on said band with the latter having longitudinally spaced portions thereof slidingly received through the sleeve openings of said brackets and with said second flanges of said brackets, exclusive of said strip portion abutted against the inner surface portions of the corresponding band portions and said first flanges projecting outwardly from the outer periphery of said band and disposed in substantially coplanar relation, the openings in each first flange comprising an elongate opening extending longitudinally of said first flange each of said first flanges including a central oval portion thereof laterally offset to one side of the central plane of said first flange, said opening in each first flange being centrally disposed relative to said oval offset portion.

4,019,705

PIPE HANGING APPARATUS

Blair A. Habuda, Sr., 1890 Woodlawn Ave., Youngstown, Ohio 44514, and Anthony Kopatich, 742 Whipple Ave., Campbell, Ohio 44405

Filed Apr. 5, 1972, Ser. No. 241,342
Int. Cl.² F16L *3/00*
U.S. Cl. 248—58 **4 Claims**



1. A beam clamp for connecting a projecting flange of a structural member having a proximate layer of building material and components supporting a pipe comprising, a body portion, a pair of jaw means extending outwardly from said body portion, fastening means selectively positionable with respect to one of said pair of jaw means to engage the flange of the structural member between it and the other of said pair of jaw means for holding the clamp positioned on the structural member, securing means in said body portion for engaging the components supporting a pipe, and rib means on the outside of one of said pair of jaws positioned substantially longitudinally thereof to facilitate insertion of said one of said pair of jaws between the projecting flange of the structural member and the proximate layer of building material and to thereafter resist turning forces applied to the beam clamp.

4,019,706

PIPE HANGER

George N. Weiland, Sr., Mundelein, Ill., assignor to Imoco-Gateway Corporation, Chicago, Ill.

Filed Mar. 8, 1976, Ser. No. 664,705
Int. Cl.² E21F *17/02*
U.S. Cl. 248—62 **3 Claims**

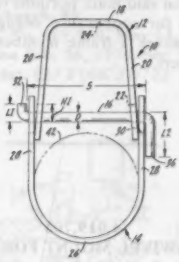
1. A pipe hanger comprising:

an inverted generally U-shaped yoke including a bight portion and two yoke arms, each yoke arm having an aperture therein, the two yoke arm apertures being of uniform size and having top and bottom edges each forming a continuous curve;

mounting means for mounting the yoke on a support with the bight portion of the yoke substantially horizontal and the yoke arms extending downwardly therefrom;

a substantially U-shaped saddle having a generally semicircular bight portion and two saddle arms, the saddle arms being assembled on the yoke arms in partial overlapping arrangement, each saddle arm having an aperture at least partially aligned with the aperture in the adjacent yoke arm, the two saddle arm apertures being of uniform size and having top and bottom edges each forming a continuous curve;

and a mounting rod of substantially uniform diameter D and consistent cross-sectional configuration throughout its length, extending through the apertures in both yoke arms and both saddle arms to join the saddle to the yoke, the mounting rod having a first end of length L1 bent at an angle of about 90° to the axis of the rod and the opposite end of a greater length L2 bent at an angle of about



90° to the axis of the rod, the two rod ends being separated by a distance S only slightly larger than the distance across the assembled yoke and saddle;

the apertures in the innermost arms of the yoke-saddle assembly having a vertical dimension slightly larger than L1 but smaller than L2;

and the apertures in the outermost arms of the yoke-saddle assembly having a vertical dimension H2 slightly larger than L1 but smaller than L2 and a horizontal dimension W slightly larger than D but smaller than L1;

whereby the pipe hanger can be assembled with the mounting rod in any orientation in which the first end of the rod is aligned with the vertical dimension H2 of the apertures in the outermost arms of the assembly and with either arm of the yoke engaging either arm of the saddle, and the weight of the saddle will maintain the pipe hanger in assembled condition and preclude inadvertent withdrawal of the mounting rod.

4,019,707

DEVICE FOR SUPPORTING FLUID RECEPTACLES

David G. Quinn, Round Lake, Ill., and Richard A. Rauschenberger, Brookfield, Wis., assignors to Will Ross, Inc., Milwaukee, Wis.

Filed Oct. 30, 1975, Ser. No. 627,442
Int. Cl.² B65B *67/12*
U.S. Cl. 248—95 **15 Claims**

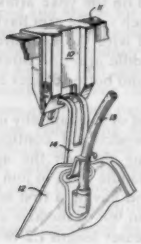
1. A device for supporting fluid receptacles on frame members comprising:

a first member having a substantially-flat main portion and a substantially-flat minor portion perpendicular to said main portion at one end thereof for support on the top of a frame member;

attachment means on said main portion for engaging a fluid receptacle;

a second member having a substantially-flat main portion hingedly-joined at one end to said first member at the end opposite said perpendicular portion for rotation from an open position to a closed position, and having a semi-rigid, wing at the other end thereof for contacting the

lower surface of a frame member, said wing extending outwardly and upwardly below said perpendicular portion when said device is in its closed position; and



latching means on said main portions of said first and second members for cooperative engagement thereof and operable to secure a frame member between first and second members.

4,019,708

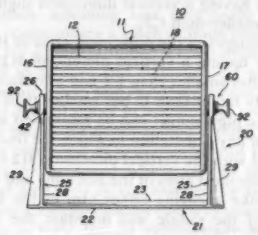
LATCHABLE SWIVEL MOUNT FOR LOUDSPEAKER

Robert E. Croup, Indianapolis, Ind., assignor to Acoustic Fiber Sound Systems, Inc., Indianapolis, Ind.

Filed Oct. 29, 1975, Ser. No. 626,745

Int. Cl.² A47F 5/12

U.S. Cl. 248—137 **21 Claims**



1. A latchable swivel mount comprising first and second swivel members coupled for relative rotational movement about a predetermined common axis and for relative axial movement along said axis, first detent means carried by said first swivel member, second detent means carried by said second swivel member and adapted for engagement with said first detent means to prevent relative rotational movement of said first and second swivel members, said first and second swivel members being movable axially between a swivel configuration wherein said first and second detent means are disengaged to permit relative rotational movement of said first and second swivel members and a latching configuration wherein said first and second detent means are engaged to prevent relative rotational movement of said first and second swivel members, and latch mechanism operable between a latching condition for locking said first and second swivel members in the latching configuration thereof and a release condition permitting relative axial movement of said first and second swivel members between the swivel and latching configurations thereof, said latch mechanism being manually operable between the latching and release conditions thereof only when said first and second detent members are in the latching configuration thereof.

4,019,709

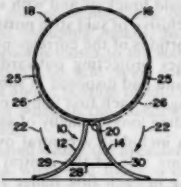
DRUM STAND

Harold F. Mason, P.O. Box 10139, Tampa, Fla. 33679

Filed May 30, 1975, Ser. No. 582,437

Int. Cl.² A47G 23/02

U.S. Cl. 248—150 **3 Claims**



1. A support device in combination with a substantially cylindrical container having an external surface including indentation means formed in inset relation to the exterior surface of the container, said indentation means extending about a substantial portion of the substantially cylindrical container, said support device comprising:

first and second support leg means each having a arcuate configuration substantially corresponding to the curved surface of the substantially cylindrical container;

base means affixedly attached to the substantially cylindrical container and disposed in interconnecting relation between said first and second support leg means and the container said first and second leg means being movably interconnected to said base and being movable relative to the substantially cylindrical container and between a supporting and a non-supporting position; and

retaining means disposed in interconnecting relation to each of said leg means when in said supporting position, whereby said leg means are maintained in said supporting position due to interconnection by said retaining means;

said indentation means being a depth dimension substantially equal to the thickness of each of said first and second support leg means to establish a substantially flush engagement between said first and second support leg means and the exterior surface of the substantially cylindrical container enabling the container to be rolled when said first and second support leg means are positioned in said indentation means in the non-support position.

4,019,710

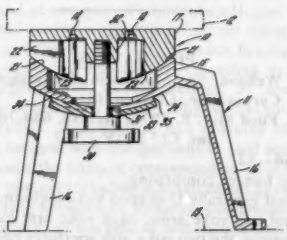
INSTRUMENT SUPPORT SOCKET

Chadwell O'Connor, Newport Beach, and Richard A. Charlson, Dana Point, both of Calif., assignors to Chadwell O'Connor, Newport Beach, Calif.

Filed Feb. 11, 1976, Ser. No. 657,036

Int. Cl.² F16M 11/14

U.S. Cl. 248—181 **1 Claim**



1. An instrument support comprising, in combination, a base having an upper ring defining an annular locking surface

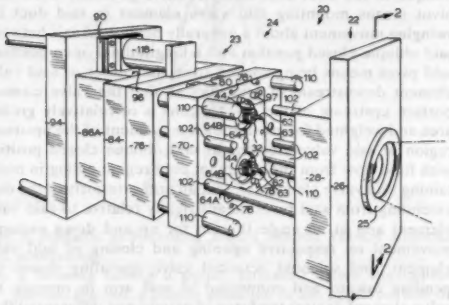
having a substantially open center, a plate adapted to mount an instrument and proportioned to fit over said ring, said plate having a plurality of spaced, radially extending feet with surfaces engaging said locking surface, said feet surfaces defining segments of an annular surface that is a section of an external spherical surface so that said plate rocks smoothly in said ring, said feet being spaced and proportioned to define substantial clearance spaces between adjacent feet, said feet surfaces terminating with sharp, radially extending edges so as to clean and better grip said locking surface, a threaded member for selectively drawing together and thus clamping said external spherical surfaces against said annular locking surface so as to prevent relative movement between said base and said plate, said member being threaded into said plate and sandwiching a washer against a clamping surface on said ring, said washer and said clamping surface defining spherical sections having the same approximate center as said internal and external spherical surfaces, and said washer spherical section being defined by a plurality of sharp edged ridges on the washer so as to substantially reduce the contacting area of said spherical sections.

4,019,711

MOULD FOR CLOSURE CAPS WITH INTERMITTENT THREADS UNDERCUTS OR HOLD-DOWN LUGS

Jack Altenhof; John Altenhof, both of Windsor, and Robert Chartier, Toronto, all of Canada, assignors to J & J Tool and Mold Ltd. and Consumers Glass Co., Ltd., both of Toronto, Canada

Filed Nov. 10, 1975, Ser. No. 630,327
Int. Cl.² B29F *1/14*; B29D *15/00*; B29C *7/00*
U.S. Cl. 249—59 **16 Claims**



1. A core, useful for moulding closure caps, each closure cap having a top, a depending skirt, and having securing means secured to the inner wall of the skirt, said securing means comprising interrupted threads or hold-down lugs, said core having:

a. a top forming portion;

b. a plurality of skirt forming portions, circumferentially separated by a plurality of generally axially disposed channels in the outer peripheral wall of the core, each channel extending from at least a point intermediate the length of the core to the top forming portion and having its bed sloped generally radially inwardly in a direction towards said top forming portion from a position adjacent the other end of the channel;

c. a plurality of riser segments corresponding to the plurality of channels secured for slidable movement within the channels, relative to the core, each riser segment having an outwardly directed flange secured on the end of the segment opposite the top forming portion to permit simultaneous movement of the riser segments relative to the core from a position completely within the channel having one end proximate the top forming portion of the core, to a position on the side of the top forming portion, remote the other end of the core, each riser segment being of the same thickness as the corresponding depth of the channel in which it is situate when such end of the riser is proximate the top forming portion of the core so as to form on the outer periphery of such end of each riser, a top forming portion to co-act with the top forming portion of the core when juxtaposed therewith and skirt and securing means forming portions;

and

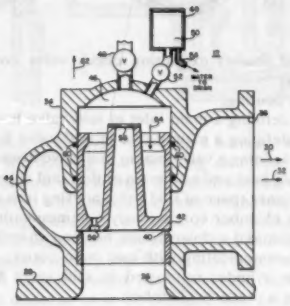
d. an annular ring secured about the periphery of said core and over said channels and said risers for securing said riser segments within said channels.

4,019,712

POSITIVE CLOSURE SYSTEM FOR FREE FLOATING DISC VALVE

Harry F. Martin, Media, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 469,930, May 14, 1974, abandoned.
This application Feb. 26, 1976, Ser. No. 661,590
Int. Cl.² F16K *31/122*
U.S. Cl. 251—26 **2 Claims**



1. A free floating disc valve for ON-OFF control of an elastic fluid, said free floating disc valve comprising:

a housing having an inlet port and an outlet port disposed therein,

a valve disc movable within said housing from a seated position to a fully open position,

said disc being so disposed within said housing to isolate said inlet port of said outlet port when said disc is in said seated position,

said disc having an opening extending therethrough,

a pressure chamber defined by the interior of said housing and said disc, so that when said disc is in its seated position, said elastic fluid passes through said opening in said disc and accumulates in said pressure chamber,

containment means having a single opening through which said elastic fluid passes, said single opening being disposed in communication with said pressure chamber,

means for venting said pressure chamber to a lower pressure region, and

means for opening and shutting communication between said containment means and said pressure chamber,

said opening and shutting means and said venting means being operable in such a manner that when said disc is seated and said venting means is closed, said means for opening and shutting communication between said containment means and said pressure chamber are open, allowing elastic fluids to fill said containment means, and when said venting means is open, said opening and shutting means are shut trapping elastic fluid in said containment means, whereby said disc moves from its seated position to its fully open position, and upon closing said

venting means said opening and closing means opens thereby rapidly initiating movemnent of said disc from its fully open position to its seated positions.

4,019,713

RAPID SHUTOFF EXTRACTION CHECK VALVE

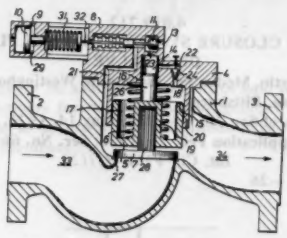
Hans Deinlein-Kalb, Nurnberg, Germany, assignor to AEG-Kanis Turbinenfabrik GmbH, Nurnberg, Germany

Filed July 22, 1975, Ser. No. 598,024

Claims priority, application Germany, July 25, 1974, 2435728

Int. Cl.² F16K *31/122*

U.S. Cl. 251—28 **8 Claims**



1. A rapid shutoff extraction check valve comprising in combination:

a. a valve housing;

b. means defining a main inlet in said valve housing;

c. means defining a main outlet in said valve housing;

d. means defining a valve seat in said valve housing between said main inlet and said main outlet; said valve seat dividing the inner space of said valve housing into an upstream housing chamber continuously communicating with said main inlet and a downstream housing chamber continuously communicating with said main outlet;

e. a guide cylinder supported in said valve housing and defining a pressure chamber;

f. an actuating piston slidably received in said guide cylinder and bounding said pressure chamber; said actuating piston having an outer piston face operatively exposed to pressure prevailing in said downstream housing chamber; said actuating piston having a withdrawn position and an advanced position;

g. a movable valve body held in said actuating piston by a support means; said support means providing for a mechanically free movement of said movable valve body into a closed position in which it engages said valve seat for blocking communication between said main inlet and said main outlet and into an open position in which it is spaced from said valve seat for maintaining communication between said main inlet and said main outlet; said mechanically free movement of said movable valve body being relative to said actuating piston and being provided solely in said withdrawn position of said actuating piston;

h. means defining a discharge outlet in said valve housing;

i. first channel means connecting one of said housing chambers with said discharge outlet;

j. second channel means connecting said pressure chamber with said discharge outlet and with said one housing chamber through said first channel means; and

k. auxiliary valve means having a first position in which it maintains communication, through said first and second channel means, between said one housing chamber and said pressure chamber and blocks communication between said pressure chamber and said discharge outlet; said auxiliary valve means having a second position in which it maintains communication, through said second channel means, between said pressure chamber and said discharge outlet and blocks communication between said one housing chamber and said pressure chamber;

l. means for moving said actuating piston from said withdrawn position into said advanced position solely in said first position of said auxiliary valve means; and

m. means provided on said actuating piston for moving said valve body into said closed position upon movement of said actuating piston into said advanced position and for maintaining said valve body in said closed position as long as said actuating piston is maintained in said advanced position.

4,019,714

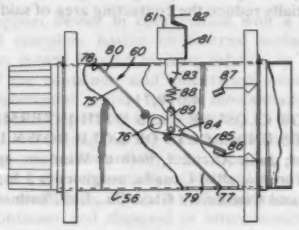
VALVE CONSTRUCTION

Marlin Kemmerer, 2511 S. Lloyd St., Philadelphia, Pa. 19142

Division of Ser. No. 566,038, April 7, 1975. This application Oct. 24, 1975, Ser. No. 625,509

Int. Cl.² F16K *1/22*

U.S. Cl. 251—138 **2 Claims**



1. A valve construction comprising a duct, a valve element extending across and in closing relation with the duct when oblique to the duct axis, freely rotative generally horizontal pivot means mounting said valve element in said duct for swinging movement about a generally horizontal axis between said oblique closed position and a longitudinal open position, said pivot means being spaced from the center of said valve element downstream of said duct so that the valve element portion upstream of the pivot means is of relatively greater area and weighted for gravitational movement of the upstream region of said valve element to said oblique closed position with fluid flow from the upstream duct region aiding in maintaining said valve element closed, an arm exteriorly of the duct extending from said pivot means rigidly relative to said valve element and at an angle thereto for up and down swinging movement on respective opening and closing of said valve element, and solenoid actuated valve operating means depending toward and connected to said arm to operate the valve element against the force of gravity and differential fluid pressure.

4,019,715

CABLE BLOCK

Andrija Vugrek, Madison, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed June 9, 1976, Ser. No. 694,425

Int. Cl.² E21C *29/16*

U.S. Cl. 254—134.3 R **10 Claims**

1. A cable block adapted for mounting on a supporting strand, and for temporarily supporting a section of cable prior to the latter being supported along and by the strand comprising:

a frame having at its upper end a strand-engaging hanger section, and at its lower end a pulley support section

a pulley rotatably mounted on said lower support section for temporarily supporting and guiding the cable, and

a strand confining and cable block locking means mounted on said upper frame hanger section, said means including a pair of pivotal cams adapted to engage said strand from opposite sides thereof such that said cams permit axial movement of said cable block along said strand in only

one preselected direction, which direction depending on the particular oppositely inclined angles of orientation

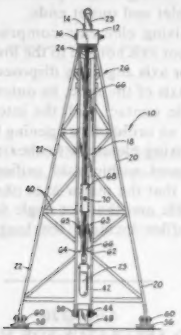
chosen for said cams relative to an engaged strand, while positively locking said cable block from movement along said strand in the opposite direction.

4,019,716

FOLDABLE SELF-LEVELING TRIPOD SHAPED VEHICLE BUMPER JACK

Eugene C. Smith, 412 Maple St., Greensburg, Kans. 67054

Filed Sept. 2, 1975, Ser. No. 609,672
Int. Cl.² B66C *23/60*
U.S. Cl. 254—139 **3 Claims**



1. A foldable self-leveling tripod shaped vehicle bumper jack comprising:

a. a housing having a pulley mounted inside the center portion thereof, a handle attached to the upper portion of said housing;

b. a channeled vertical leg having a rotatable base plate attached to one end of said vertical leg, said plate rotatable in a plane perpendicular to the plane of the vehicle's bumper, said channeled vertical leg partially closed forming a slot along the length thereof;

c. first and second angled legs having rotatable base plates attached to one end of said angled legs, the other end of said angled legs attached to said housing; said plates rotatable in a plane perpendicular to the plane of the vehicle's bumper, said angled legs rigidly secured together by bracing attached to the sides thereof;

d. a cable riding inside said channeled vertical leg, said cable having a bumper hook attached to one end of said cable for securing to the vehicle's bumper;

e. a worm gear driven windlass attached to said vertical leg for winding the other end of said cable thereon, said windlass turned by a removable crank, said windlass receiving said cable as it is wound around said pulley;

f. a hook, the end of said hook attached to said vertical leg, the hook portion of said hook secured to said bracing so that said angled legs are held in place as the vehicle is raised and lowered; and

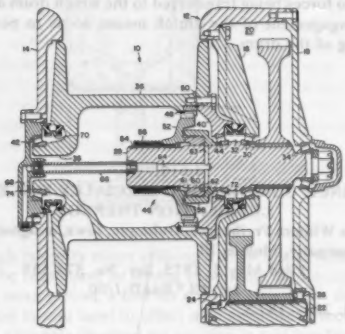
g. a cable lock secured to the cable and riding in said channeled vertical leg, the width of said slot greater than the width of said cable and less than the width of said cable lock.

4,019,717

WINCH CABLE DRUM MOUNTING AND DRIVE CONNECTION

Thomas William Freiburger, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 5, 1975, Ser. No. 574,556
Int. Cl.² B66D *1/00*
U.S. Cl. 254—187.8 **6 Claims**



1. In a winch of the type including a housing, a drive train mounted in the housing and including an output shaft at its terminus, a hollow winch drum mounted for rotation about a fixed axis coaxial with said output shaft and having said output shaft extending thereinto, a clutch means including a first clutch element axially shiftably mounted on said output shaft, a biasing means normally urging said first clutch element to a first location on said output shaft, a second clutch element fixed to said drum so as to be engaged with said first clutch element for being driven by the latter when it is in said first location, and actuator means for selectively shifting said first clutch element in opposition to the biasing means to a second location on said shaft wherein the first clutch element is disengaged from the second clutch element, an improved mounting for the winch drum and output shaft, comprising: first and second bearing means respectively mounting opposite first and second ends of the winch drum for rotation in a first wall of the housing and for rotation on the output shaft; third and fourth bearing means respectively mounting said output shaft for rotation in second and third walls of said housing; said second bearing means being mounted on the output shaft between, and in direct engagement with, a shoulder of the output shaft and with the actuator means; and said actuator means being supported on the output shaft for concurrent action against the first clutch element and reaction against the second bearing means during shifting of the first clutch element to its second location, whereby the winch drum may be disengaged from being driven by the output shaft without reaction forces from the clutch means being transferred thereto.

6. A winch comprising: a housing; a drive train mounted in said housing and including an output shaft rotatably mounted in adjacent first and second walls of the housing; a hollow cable drum located between a third and the second wall of said housing and having an end of said output shaft terminating therewithin; said drum having opposite ends respectively rotatably mounted in said third wall and on said output shaft; clutch means normally establishing a driving connection between the output shaft and the drum and including a first toothed clutch element axially shiftably mounted on a portion of the output shaft located within the drum; a biasing means mounted on the output shaft between the terminal end thereof

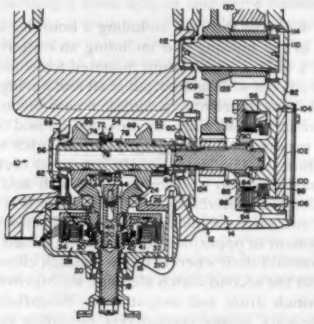
and the first toothed clutch element and normally acting against the latter to position it in a first location; a second toothed clutch element fixed to the drum and being engaged with the first toothed clutch element when the latter is in said first location; an actuator means including an actuating element shiftably mounted on said output shaft for moving the first toothed clutch element in opposition to said biasing means to a second location wherein the first and second toothed elements are disengaged from each other; and said actuator means including reaction force transferring means acting against said output shaft when the actuator means is actuated, whereby reaction forces imposed on said output shaft respectively by said biasing means and said actuating means during actuation of the latter balance each other resulting in no forces being transferred to the winch drum as a result of disengagement of the clutch means so as to permit free spooling of the drum.

4,019,718

WINCH CONSTRUCTED SPECIALLY FOR EASY LUBRICATION THEREOF

Thomas William Freiburger, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 5, 1975, Ser. No. 574,555
Int. Cl.² B66D *1/00*
U.S. Cl. 254—187.5 **4 Claims**



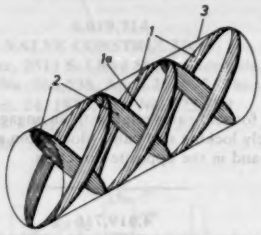
1. A winch construction and lubrication means therefor, comprising: a housing defining first and second spaced upright wall sections and a fluid-tight cavity formed in part by said second wall section; a cable drum having a hollow interior and opposite first and second open ends; first and second bearing means rotatably supporting said first and second ends of the cable drum respectively in said first and second wall sections; a drive train located in said cavity and including an output shaft extending into said drum; a lubrication fluid path means including the interior of said cable drum and providing fluid communication among said first and second bearing means and said cavity; said drive train including hydraulically operable main clutch means and brake means including respective pressurizable cylinders; a source of fluid pressure; a reservoir; control valve means connected between said source of fluid pressure and the pressurizable cylinder of said main clutch means, the pressurizable cylinder of said brake means and said lubrication fluid path means; fluid passage means exclusive of said control valve means connecting the pressurizable cylinders of said brake means and said clutch means to said lubrication fluid path means; said control valve means being shiftable at least between a neutral position blocking the source of fluid pressure from the brake means and main clutch means and first operating position wherein the source of fluid pressure is connected to the brake means and clutch means.

4,019,719

FLUID MIXING DEVICE

Hans H. Schuster, 166 Luitpoldstrasse, and Peter Zehner, 11 Alwin-Mittasch-Platz, both of 6700 Ludwigshafen, Germany

Filed Apr. 1, 1976, Ser. No. 672,612
Claims priority, application Germany, June 5, 1975, 2525020
Int. Cl.² B01F *5/00*
U.S. Cl. 259—4 AB **11 Claims**



1. A device for mixing a plurality of fluid material streams, said device comprising:

a flow-bounding tube;

a plurality of consecutively arranged mixing elements of equal spatial configuration positioned within said tube between its inlet and outlet ends;

each of said mixing elements comprising an outer baffle having its minor axis normal to the longitudinal axis of the tube, its major axis angularly disposed with respect to the longitudinal axis of the tube, its outer peripheral contour substantially in contact with the internal wall surface of the tube, and an orifice-like opening formed at its center;

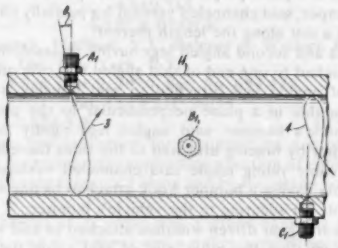
each of said mixing elements further comprising an inner baffle positioned within said orifice-like opening in a manner such that the minor axes of said outer and inner baffles coincide and that the angle formed by said outer and inner baffles includes the longitudinal axis of the tube.

4,019,720

METHOD AND APPARATUS FOR MIXING VISCOUS MATERIALS

Gerard A. Levesque, Hudson, and Glen E. W. Saidla, Hampton Falls, both of N.H., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Oct. 16, 1975, Ser. No. 623,104
Int. Cl.² B01F *15/00*
U.S. Cl. 259—4 R **6 Claims**



4. A static mixer for mixing viscous material comprising:

an elongated tube having a first end and a second end for transversal therethrough toward said second end by a stream of viscous material to be mixed;

a plurality of successive first nozzle means being spaced at predetermined locations along said elongted tube, said

nozzle mean having a substantially radially directed entry port inclined in a forwardly direction toward said second end of said elongated tube at an angle of about 10° with respect to the radius of said elongated tube for introducing jets of high pressure fluid substantially radially to the longitudinal axis of said elongted tube and in a forwardly direction, each succeeding first nozzle means being located on opposite sides of the elongated tube from the preceding first nozzle means;

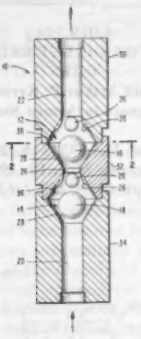
a plurality of successive second nozzle means being spaced at predetermined locations along said elongated tube, alternate members of said second nozzle means having a substantially tangentially directed entry port and inclined in a forwardly direction toward said second end of said elongated tube at an angle of about 10° with respect to the radius of said elongated tube for introducing jets of high pressure fluid in a first substantially tangential and forward direction, and the remainder of said second nozzle means having a substantially counter tangentially directed entry port and inclined in a forwardly direction toward said second end of said elongated tube at an angle of about 10° with respect to the radius of said elongated tube for introducing jets of high pressure fluid in second substantially tangential and forward direction, each succeeding second nozzle means being located along the elongated tube at a point which is between two successive first nozzle means.

4,019,721

FLOWING FLUID MIXING DEVICE AND METHOD

Rene J. Langner, Chelsea, N.Y., assignor to Bio/Physics Systems, Inc., Mahopac, N.Y.

Filed June 30, 1975, Ser. No. 591,482
Int. Cl.² B01F *13/00*
U.S. Cl. 259—4 AC **19 Claims**



1. A flowing fluid mixing device comprising

a housing defining at least one chamber,

a single spherical body confined within said chamber,

said housing defining an inlet opening communicating with one end of said chamber and an outlet opening communicating with the other end of said chamber,

said outlet opening being the only inlet to said chamber,

means for supplying a plurality of substantially fluid unmixed materials to said inlet opening for transmission through said chamber,

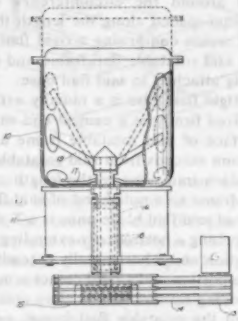
the diameter of said spherical body being smaller than the diametric spacing of the walls of said chamber so as to permit free movement of said spherical body within said chamber.

4,019,722

HIGH INTENSITY MIXER UTILIZING A SINGLE SPEED MOTOR

Albert J. Shohet, Hamilton, Ohio, assignor to Littleford Bros. Inc., Florence, Ky.

Filed Nov. 28, 1975, Ser. No. 635,890
Int. Cl.² B01F *7/00*
U.S. Cl. 259—105 **3 Claims**



1. A high intensity mixer utilizing a single speed motor, said mixer to be responsive to mixing conditions, said mixer comprising: a mixing bowl, a first set of mixing elements disposed for rotation in said bowl to effect mild agitation, a second set of mixing elements disposed for rotation in said bowl to effect increased agitation when operatively connected with said first set of mixing elements, a first rotatable shaft to which said first set of mixing elements is fixed for rotation therewith, a second rotatable shaft to which said second set of mixing elements is fixed for rotation therewith, said second shaft being free-wheelable with respect to said first shaft, a single speed motor, drive means connecting said first shaft to said motor so that said first shaft is rotatable at a certain speed when said motor is actuated, first connect means fixed to said first rotatable shaft for rotation therewith, second connect means fixed to said second rotatable shaft for rotation therewith, clutch means to selectively engage and disengage said first and second connect means to control mixing and process requirements, and a sensor for actuating said clutch means in response to mixing conditions in said bowl, whereby when said clutch means are actuated to engage said first and second connect means said second shaft will rotate with said first shaft at said certain speed and in the same direction, and whereby when said first and second connect means are disengaged said second shaft will free-wheel with respect to said first shaft.

4,019,723

MANURE TREATMENT APPARATUS AND PROCESS

Marvin L. Urbanczyk, Rte. No. 2, White Deer, Tex. 79097

Filed Feb. 18, 1975, Ser. No. 550,272
Int. Cl.² B01F *7/04*
U.S. Cl. 259—183 **5 Claims**

1. Apparatus comprising a rigid frame assembly, a flail assembly, a wheel assembly, a spray assembly and a power means in operative combination;

1. said rigid frame assembly comprising a rigid elevated horizontal transversely and longitudinally extending platform and, firmly attached to the sides thereof, a rigid longitudinally extending left vertical wall and a rigid longitudinally extending right vertical wall;

2. said flail assembly comprising a rigid transversely extending rotatably mounted flail frame with a series of flail means supported on and spaced along the length of said flail frame, and

a. flail frame assembly mounting support means on said frame assembly for said flail frame assembly, said flail

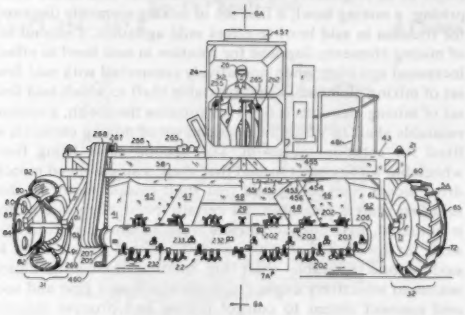
frame rotatably supported on said flail frame assembly support means,

b. flail drive means supported on said frame assembly and operatively attached to said flail frame for rotating said flail frame about the length thereof and driving the flail means of the flail assembly first upwardly and then downwardly with respect to the direction of motion of said frame assembly;

c. said flail means located on the flail frame at points equi-spaced around the circumference of the flail frame and equi-spaced along the length thereof, each of said flail means comprising a rigid flail base firmly attached to said rotatable flail frame and a flail blade unit pivotally attached to said flail base,

i. and said rigid flail base is a radially extending rigid column fixed firmly at a central end thereof to the outer surface of said rotatable frame and said flail base column extends from said rotatable flail frame in a direction transverse to the length of said rotatable flail frame to a radial end of said flail base,

ii. and each of said flail blade units is a T-shaped blade unit comprising a horizontally extending flat left flail blade portion and a horizontally extending flat right flail blade portion and a rigid center arm, said center arm extending transversely to the central longitudinal axis of the rotatable flail frame, and each flail blade portion has a sharp-edged front cutting edge extending in a direction parallel to said central longi-



tudinal axis of said rotatable flail frame and a thick rear edge, said edges spaced apart from each other in a direction transverse to the central longitudinal axis of said flail frame and each said flail blade is firmly joined to a radial portion of said center arm, and said center arm is pivotally attached to said rigid flail base near its radial end, said right and left flail blade portions being mirror images of each other and extending in a plane which is parallel to the length of the rotatable frame and which plane is transverse to the length of said center arm,

iii. and a pivotal flail blade support means is attached to said flail base column near its radial end and extends parallel to said longitudinal axis of said rotatable flail frame and the center arm of one of said T-shaped flail blade units is pivotally attached to and supported by said pivotal blade support means on said flail base column and thereby pivotally supported for pivotal movement about an axis parallel to and radially spaced away from said longitudinal axis of said rotatable frame.

3. said flail assembly located in chamber formed by

a. an imperforate roof located below said elevated horizontal elevated horizontal platform; and

b. said vertically extending left vertical wall and said vertically extending right vertical wall; and

c. a rear wall with a central rear orifice opening therein, said rear wall comprising a left rear wall extending rightwards to a flexible left rear orifice edge thereof and a right rear wall extending leftwards to a flexible right rear orifice edge thereof and a top rear wall extending downwardly from said chamber roof to a horizontally extending lower edge reaching from the left edge of said flexible left rear orifice edge to the flexible right rear orifice edge; said left rear wall and said right rear wall and said top rear wall being resilient, said left and right rear walls being firmly held at their lateral edges by said left and right vertical walls respectively and said top rear wall firmly held at its top by said elevated horizontal platform, and said central rear orifice being wider at its bottom than at its top,

d. a front opening below said roof and between the front ends of said side walls and said drum and said flail assembly being rotatably supported on said side walls in said chamber on said flail frame assembly support means therefor,

4. said spray assembly comprising a plurality of nozzle means extending transversely of said chamber and a baffle means, said nozzle means attached to said roof and located rearwardly and above and directed at said baffle means, said baffle means attached at its front end to said roof and extending downwardly and rearwardly and located rearwardly and above said flail assembly and extending below said nozzle means, said baffle and said roof outlining a space within which are located said nozzle means, and a conduit for operatively connecting said nozzle means to a source of water;

5. said wheel assembly comprising a pair of drive wheels, one on each side of said frame assembly exterior of said chamber near the front end of said rigid frame assembly, and another pair of rear wheels, one on each side of said frame assembly near the rear end thereof, and

6. an operator compartment firmly attached to said elevated horizontal platform near the front thereof, power means supported on said platform, and control means for said flail assembly located in said compartment and operatively connected to said power means and operatively attached to said flail drive means, and wheel assembly control means located in said compartment and operatively connected to said power means and connected to said drive wheels.

4,019,724

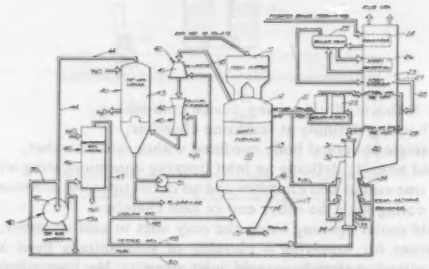
APPARATUS FOR THE DIRECT REDUCTION OF IRON ORES

Clyde L. Cruse, Jr., and Arthur P. Kerschbaum, both of Middletown, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Division of Ser. No. 333,673, Feb. 20, 1973, Pat. No. 3,905,806. This application Mar. 10, 1975, Ser. No. 557,167

Int. Cl.² C22B *5/12*

U.S. Cl. 266—156 **5 Claims**



1. In apparatus for the gaseous reduction of sized iron ores in a shaft furnace, by means of a reducing gas atmosphere intoduced into said furnace at elevated temperature, the combination of a catalytic hydrocarbon and steam reformer com-

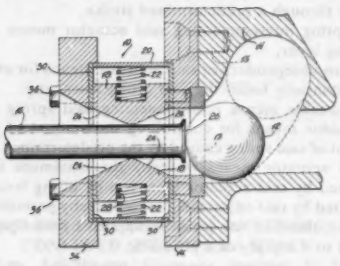
prising an elemental nickel catalyst adapted to generate a reducing gas atmosphere consisting essentially of about 85% to about 98% hydrogen and carbon monoxide by volume, and about 1% to about 14% water vapor by volume, with the hydrogen: carbon monoxide volume ratio being at least 2:1; a shaft furnace comprising a reducing section, a cooling section and a top section; means for transferring said reducing gas atmosphere as generated in said reformer directly to said reducing section of said shaft furnace at elevated temperature without drying and reheating of said atmosphere; means for withdrawing said gas atmosphere from said top section of said shaft furnace; means for cleaning, cooling and drying the withdrawn top gas; and means for delivering at least a portion of the cleaned and cooled top gas to said reformer for combustion with air while precluding any contact of said top gas with said catalyst.

4,019,725

GAS SEAL AND SILENCER FOR USE ON TUYERE BODY

Toussaint Cote, Noranda, Canada, assignor to Noranda Mines Limited, Toronto, Canada

Filed July 24, 1975, Ser. No. 598,806
Claims priority, application Canada, Apr. 21, 1975, 225085
Int. Cl.² F27D *3/16*
U.S. Cl. 266—169 **9 Claims**



1. A gas seal and silencer for attachment to a tuyere body to minimize the gas volume and pressure loss during the insertion of a punch bar through a the blast of gas leaking out during opening of the tuyere valve, comprising:

a. a housing adapted to be secured to the tuyere body with its longitudinal axis substantially in alignment with the longitudinal axis of the tuyere and having end walls provided with a central opening for passing a punch bar through the longitudinal axis of the housing;

b. a plurality of closure members mounted for movement toward and away from the longitudinal axis of the housing and including means located inside the housing for pressing said closure members toward the longitudinal axis of the housing before insertion of the punch bar through the longitudinal axis of the housing and for forcing said closure members against the periphery of the punch bar after insertion of the punch bar so as to form a seal between the closure members and the punch bar; and

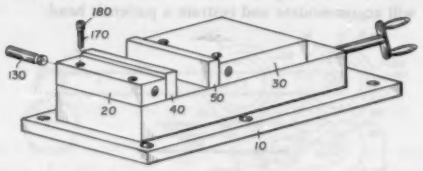
c. means for guiding said closure members in their movement toward and away from the longitudinal axis of the housing, said means for guiding the closure members consisting of wear plates located on each side of the closure members, said wear plates and the sides of the closure members being both made of hardened metals so as to reduce wear of the sliding surfaces.

4,019,726

CAM LOCK JAWS FOR MACHINIST VISE

Lester Willis Turner, Longmont, Colo., assignor to The Raymond Lee Organization, Inc., a part interest

Filed May 4, 1976, Ser. No. 683,012
Int. Cl.² B25B *1/24*
U.S. Cl. 269—261 **3 Claims**



1. In combination:

a machinist's vise having a fixed head and a movable head, each head having first and second pairs of cylindrical recesses, the recesses in each first pair being parallel and being disposed longitudinally in the corresponding head, the recesses in each second pair being disposed along a common axis and being disposed transversely in the corresponding head, each first pair recess intersecting a corresponding second pair recess;

a pair of jaws, each jaw having two parallel spaced cylindrical members extending outward therefrom at right angles, each jaw being associated with a corresponding head with the members secured thereto extending into corresponding first pair recesses in the corresponding head; and

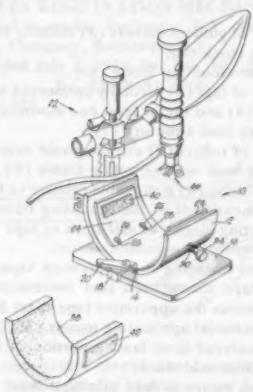
four cylinders, each cylinder being disposed in a corresponding one of the two second pairs of recesses and being rotatable therein.

4,019,727

HEAD SUPPORT AND RESTRAINING APPARATUS

William O. Martin, Chesterland, and Harry Derda, Beachwood, both of Ohio, assignors to Case Western Reserve University, Cleveland, Ohio

Filed Nov. 20, 1975, Ser. No. 633,840
Int. Cl.² A61G *13/00*
U.S. Cl. 269—328 **12 Claims**



1. An apparatus for supporting and restraining the head of a patient during medical treament comprising:

a base member,

an outer support member mounted on said base member, said outer support member comprising a generally arcuate support member adapted to be moved in a generally arcuate path relative to said base member so as to position said arcuate support member in any one of a number of desired angular positions relative to said base member,

means for holding said arcuate support member in a desired angular position,

head restraint means mounted within said outer support member for restraining a patient's head, said restraint means including movable portions adapted to conform to and restrain a patient's head; and

means for moving said movable portions of said head restraint means to positions wherein said restraint means will accommodate and restrain a patient's head.

4,019,728

APPARATUS AND SHINGLED STRIP FORMED THEREFROM

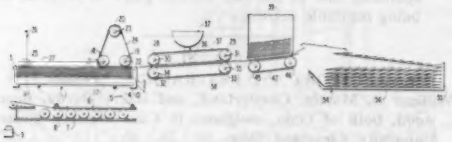
Rafael A. Liclican, 160 Kamias Road, Quezon City, Philippines

Filed Aug. 1, 1974, Ser. No. 493,948

Claims priority, application Philippines, Aug. 10, 1973, 14898

Int. Cl.² B65H *39/02*

U.S. Cl. 270—58 **8 Claims**



1. An apparatus for the manufacture of a shingled strip comprising:

a. a stack of tape sheets (17) supported on a supporting block (4);

b. a plurality of guide members (3) slidably supporting said supporting block (4);

c. at least one mounting frame (6);

d. a plurality of legs (5) pivotally connected to the supporting block (4) and the at least one mounting frame (6);

e. a stationary base structure (7);

f. a plurality of rollers (8) engaging said base structure (7) and the at least one mounting frame (6) such that the mounting frame (6) is movable relative to the base structure (7); movement of the mounting frame (6) causing the supporting block (4) and stack of tape sheets (17) to move upwardly;

g. belt means engaging the uppermost tape sheet on the stack of tape sheets such that movement of said belt means removes the uppermost tape sheet from the stack;

h. bonding material applicating means (36, 37) to apply a bonding material to at least a portion of the tape sheet removed from said stack;

i. first feeding means to feed said tape sheet from said belt means to said applicating means;

j. a shingle strip magazine (39) containing a stack of shingle strips to be affixed to the tape sheet;

k. second feeding means to feed the tape sheet from said first feeding means to said shingle strip magazine, said second feeding means positioned relative to said strip magazine such that the strips have one edge attached to the tape sheet by the bonding material as the sheet passes said magazine; and

l. means to store the completed shingled strips.

4,019,729

APPARATUS FOR CONTROLLABLY LOWERING AND LIFTING A PLY PICKING UNIT

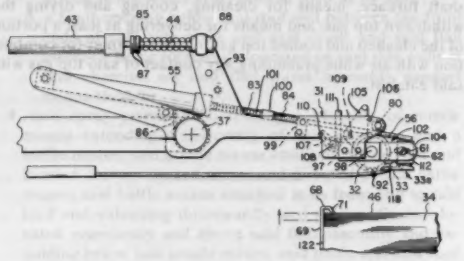
Kenneth O. Morton, Troy, N.Y., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Division of Ser. No. 471,029, May 17, 1974, Pat. No. 3,940,125. This application Nov. 12, 1975, Ser. No. 631,077

The portion of the term of this patent subsequent to Feb. 24, 1993, has been disclaimed.

Int. Cl.² B65H *3/22*

U.S. Cl. 271—18.3 **10 Claims**



1. In an apparatus for nipping and lifting a limp ply from a stack thereof, a lifting unit for controllably lowering and lifting a ply picking unit, which comprises

a. a frame

b. a ply picking unit for nipping and lifting a limp ply from a stack thereof,

c. support means for said ply picking unit, comprising a lifting lever pivotally mounted on said frame,

d. actuator means pivotally mountd on said frame and operable through a predetermined stroke,

e. a spring interconnecting said actuator means and said lifting lever,

f. means independent of said actuator means for effectively substantially balancing said lifting lever, and

g. adjustable means interconnecting said spring and said actuator means for controlling the amount of displacement of said spring caused by the predetermined stroke of said actuator means whereby the maximum force imparted by said actuator means to be lifting lever will be limited by said adjustable means thereby permitting accurate control of the pressure applied by said ply picking unit to a top ply of a ply stack.

4,019,730

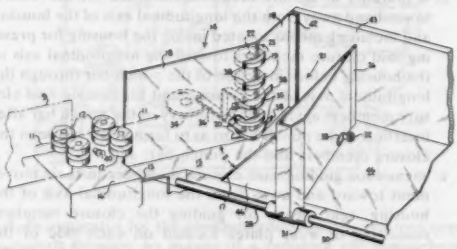
ENVELOPE STACKING SYSTEM

Frederick J. Staudinger, North Salem, N.Y., and James G. Montagnino, Monroe, Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 584,001, June 5, 1975, abandoned. This application July 23, 1976, Ser. No. 708,260

Int. Cl.² B65H *29/44*

U.S. Cl. 271—181 **5 Claims**



1. An envelope stacking system for receiving envelopes being transported in seriatim along a feed path and stacking

said envelopes in a contiguous stack, said envelopes being transported and stacked with a vertical orientation, said envelope stacking system, comprising:

means defining an envelope feed path;

transporting means disposed along said feed path for feeding envelopes in seriatim to a stacking deck, said transporting means feeding said envelopes with a vertical orientation;

a stacking deck for supporting a stack of vertically oriented envelopes, said deck having means defining an inlet window, said inlet window comprising a guide wall for guiding incoming envelopes, said guide wall having an angle bend;

driving means adjacent said guid wall for recieving incoming envelopes and thrusting them along said guide wall toward a rear portion of said guide wall causing said incoming envelopes to bend to conform to the angle bend of said guide wall;

oscillating camming means diposed adjacent and coaxially with said driving means for moving a newly received envelope agaist the stack of envelopes disposed on said deck, said oscillating camming means holding the newly received envelope against the stack until a subsequent envelope is transported to the stacking deck and approaches the inlet window, the holding of said newly received envelope against the stack serving the dual prupose of eliminating contact of said stack of envelopes with said driving means to prevent wear upon the envelopes of said stack, and in order to clear said inlet window and provide an open inlet for a subsequent incoming envelope; and

biasing means supported by the deck for biasing the stack of envelopes toward said driving means.

4,019,731

DEVICE FOR PLACEMENT OF RHYTHMICALLY CONVEYED SHEETS ON A STACK

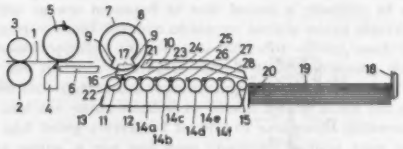
Hilmar Vits, Leichlingen, Germany, assignor to Vits-Maschinenbau GmbH, Langenfeld, Germany

Filed July 20, 1976, Ser. No. 707,100

Claims priority, application Germany, July 23, 1975, 2532880; Apr. 10, 1976, 2615864

Int. Cl.² B65H 29/68

U.S. Cl. 271—183 **18 Claims**



1. A device for placing rhythmically conveyed sheets from a conveying plane individually on a stack one after another, comprising a conveyor means for conveying the sheets, and a suction means for braking the speed of the sheets below the conveying plane, a deflecting member disposed above the conveying plane for passing the ends of the sheets into effective range of said suction means, said deflecting member being a suction conveyor roller having a plurality of projections on its periphery and rotating rhythmically with the ends of the sheets for the sheet ends to be placed on said projections.

4,019,732

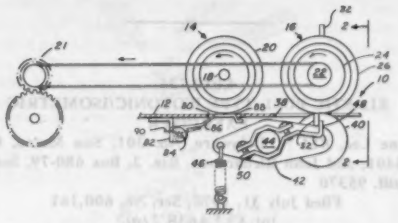
SHEET REGISTRATION MECHANISM

Clayton Edward Hunt, Jr., Rochester, and Donald James Spooner, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 2, 1976, Ser. No. 702,314

Int. Cl.² B65H 9/06

U.S. Cl. 271—245 **7 Claims**



1. A sheet registration mechanism comprising: a support establishing a travel path for sheets; means for urging such sheets seriatim along said support in said travel path; means downstream of said urging means for registering and feeding such sheets at a precise point in a predetermined time cycle for sheet movement in said travel path, said registering and feeding means including a continuously rotating feed roller mounted on a drive shaft and a pinch roller mounted in engagement with said feed roller to form a nip for feeding a sheet therebetween, a rotatable registration disc for selectively intercepting and at least momentarily stopping a sheet in said travel path upstream of said feed roller, and means for axially loading said registration disc into frictional driving engagement with said feed roller; means for selectively latching said registration disc to prevent rotation of said registration disc by said feed roller when said registration disc is in position to intercept a sheet; and adjustable means for unlatching said latching means to release said registration disc at said precise point in said time cycle whereby said registration disc may be rotated out of said sheet intercepting position enabling said feed roller to feed the intercepted sheet.

4,019,733

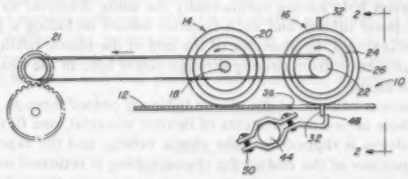
SHEET REGISTRATION MECHANISM

Michael Samuel Montalto, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 2, 1976, Ser. No. 702,313

Int. Cl.² B65H 9/06

U.S. Cl. 271—245 **4 Claims**



1. A sheet registration mechanism comprising: a support establishing a travel path for sheets; means for urging such sheets seriatim along said support in said travel path; means downstream of said urging means for registering and feeding such sheets at a precise point in a predetermined time cycle for sheet movement in said travel path, said registering and feeding means including a continuously rotating feed roller mounted on a drive shaft, a rotatable registration disc for selectively intercepting and at least momentarily stopping a sheet in said travel path upstream of said feed roller, and means for axially loading said registration disc into frictional driving engagement with said feed roller; means for selectively

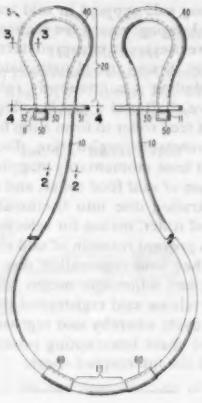
latching said registration disc to prevent rotation of said registration disc by said feed roller when said registration disc is in position to intercept a sheet; and means for unlatching said latching means to release said registration disc at said precise point in said time cycle whereby said registration disc may be rotated out of said sheet intercepting position enabling said feed roller to feed the intercepted sheet.

4,019,734

ELASTIC PULL TYPE ISOTONIC/ISOMETRIC EXERCISER

Wayne Lee, 814 N. Delaware, No. 301, San Mateo, Calif. 94401, and John Richardson, Rte. 2, Box 680-79, Sonora, Calif. 95370

Filed July 31, 1975, Ser. No. 600,161
Int. Cl.² A63B *21/02*
U.S. Cl. 272—137 **1 Claim**



1. An exercising apparatus comprising:

A single length of elastic tubing of substantially constant diameter.

first and second flexible sleeves slidably mounted over opposite ends of the elastic tubing leaving exposed a portion of each end of the elastic tubing,

first and second fastener means, each including a sheet of flexible material having two circular holes therethrough, each hole having substantially the same diameter as the elastic tubing, and each fastener means including a plug to expand the diameter of the end of the elastic tubing to prevent it from passing through either hole in the flexible material,

wherein one end of the elastic tubing is passed through one hole in one of the sheets of flexible material, one flexible sleeve is slipped onto the elastic tubing, and the exposed portion of the end of the elastic tubing is returned in the opposite direction to the previous passage through the other hole in said flexible sheet of material, and one plug is inserted into the open end of tubing,

wherein the other end of the elastic tubing is passed through one hole in the other sheet of flexible material, the other sleeves is slipped onto the plastic tubing, and the exposed portion of that end of the elastic tubing is returned in the opposite direction to the previous passage through the remaining hole in said flexible sheet of material, and the remaining plug is inserted into the open end of the elastic tubing, and

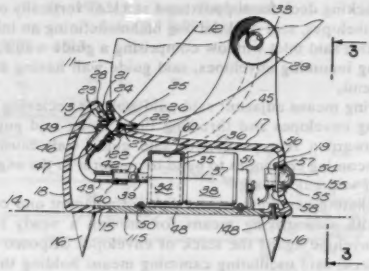
wherein two additional flexible sleeves are slideably mounted over that portion of the elastic tubing between the first and second fasterner means.

4,019,735

FOOTBALL KICKING TEE WITH VACUUM BALL RETAINER

James E. Thompson, 4201 Don Tomaso Drive, Los Angeles, Calif. 90008

Filed July 21, 1975, Ser. No. 597,486
Int. Cl.² A63B *67/00*
U.S. Cl. 273—55 B **12 Claims**



3. A football kicking tee comprising:

a portable body adapted to be removably placed on and be supported by the playing surface of a football field;

a football holding structure carried by said body and constructed to engage a football and support it in an upstanding kicking position at approximately the level of said playing surface of a field on which the body is placed, and in a relation enabling a player running along said surface to kick the ball as he runs;

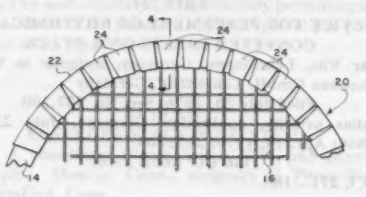
said holding structure including suction means carried by said body for retaining the ball by suction against accidental dislocation from said kicking position.

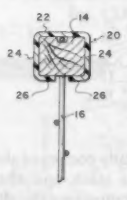
4,019,736

PROTECTIVE DEVICE FOR RACKETS

Donald L. Lehew, 13315 Flagstone, Dallas, Tex. 75240

Continuation of Ser. No. 124,350, March 15, 1971, abandoned. This application Oct. 14, 1975, Ser. No. 621,694
Int. Cl.² A63B *49/14*
U.S. Cl. 273—73 R **3 Claims**





3. A protective device for removable attachment to the curved end portion of the string network frame of a racket of the type including a handle and said string network frame, said protective device being a one-piece resilient body adapted to snap over said curved end portion and comprising:

a. an elongated strip so formed to be substantially coexten-

sive with, and disposed flush against, the forward end of said curved end portion,

b. a plurality of fingers transversely intersecting said elongated strip along loci of intersection which, when said protective device is attached to said curved end portion, are coextensive with the opposed edges of said forward end of said curved end portion, adjacent ones of said fingers being joined together through said elongated strip solely at loci of intersection and being otherwise spaced apart a sufficient distance to enable relative movement between adjacent fingers during attachment to said curved end portion, and

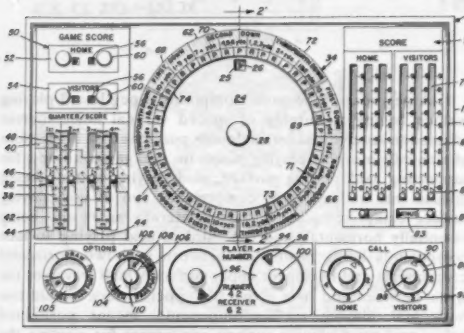
c. keeper portions transversely intersecting respective end portions of said fingers and adapted to gripably engage the underside of said curved end portion, said fingers and keeper portions being of a trapezoidal configuration and arranged in paired sets, each keeper portion of a paired set being spaced apart from, but mutually aligned with, the other keeper portion of said paired set; whereby said plurality of fingers and keeper portions provide the sole means for attaching said protective device to the curved end portion of said racket.

4,019,737

FOOTBALL GAME BOARD

William L. Witzel, 13914 Shannon Drive, Silver Spring, Md. 20904

Filed Nov. 17, 1972, Ser. No. 307,495
Int. Cl.² A63F *3/00*
U.S. Cl. 273—94 R **25 Claims**



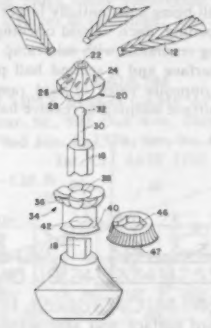
1. A game apparatus comprising a game board having a substantially flat upper surface, means to indicate the quarter score point differential between two opposing teams of a football game placed on said upper surface, said point differential score means being divided into a plurality of scoring zones, a game point selection means comprising a second indicator means mounted to said board, a plurality of segmented down and distance character indicia zones placed on said board opposite said second indicator means, each said down and distance character indicia zone containing down and distance characters representing the down of a football game and the yards needed to obtain a first down for said down and being correlated to one of said point differential scoring zones, a run and pass character indicia zone with associated indicia including numerical values placed on said board surface adjacent to and aligned with said down and distance zone, said second indictor means being adapted to be moved to designate that segment of said down and distance character indicia zone corresponding to the particular down and distance needed for a first down in a football game which is correlated to the point differential score means scoring zone indicated by the first indicator means, while simultaneously designating a numerical value for a selection of a football play, said designated numerical value accounting for the scoring of the game when the correct football play is selected.

4,019,738

GAME DEVICE AND GAME

Te-Kong Tong, 370 15th St., Norwood, N.J. 07648

Continuation of Ser. No. 592,890, July 3, 1975, abandoned. This application May 17, 1976, Ser. No. 687,095
Int. Cl.² A63B *67/18*
U.S. Cl. 273—106 R **8 Claims**



1. A game device comprising a generally pot bellied bottle shaped structure having a base portion and a conical lower wall portion forming an angle of greater than about 90° therewith, said conical lower wall portion upwardly and outwardly extending from said base portion and then reversing direction and inwardly tapering continuously to form an arcuate shaped upper wall portion having a varying diameter steadily reducing dimension, an elongated shaft in longitudinal alignment with said structure and upwardly extending therefrom, said shaft terminating in an axle member having an enlarged distal head, said axle member having a lesser diameter than that of said shaft, said shaft having a non-circular cross-section, said axle portion having a circular cross-section, a bowl shaped braking member defining a first aperture having a non-circular cross-section corresponding to that of said shaft, said first aperture having a diameter greater than the external diameter of said shaft, said shaft communicating with said aperture, said member adapted to slide upon said shaft, a wheel member defining a second aperture, said second aperture having a circular cross-section, said member disposed on said axle portion, said member having a truncated cone shaped upper section and a bowl shaped lower section, said lower section having an external shape corresponding to the inner shape of said braking member; said wheel member adapted to slide and rotate about said axle portion, said axle member being at least as long as the depth of said wheel member, said truncated cone shaped upper section defining a plurality of slotted apertures, at least one feather like projection disposed in each of said slotted apertures, said braking member adapted to slide along said shaft between said wall portion and said wheel member.

4,019,739

SHOVEL GAME

Eric L. Waite, 14808 Clark St., Van Nuys, Calif. 91401

Continuation-in-part of Ser. No. 507,332, Sept. 19, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 611,924
Int. Cl.² A63B *63/00*
U.S. Cl. 273—95 D **5 Claims**

1. A game to be placed upon a floor comprising:

a horizontal polygonal shaped base having a plurality of identically sized scoring openings arranged in a particularly selected pattern, said base being located upon said floor and spaced thereabove;

side means connected to the periphery of said base, said side means extending substantially vertically;

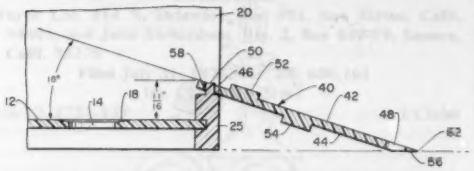
an access opening formed within said side means;

a ramp connected by connecting means to said base and

positioned within said access opening, said ramp being inclined in respect to said base, one end of said ramp contacting said floor, the other end of said ramp located a spaced distance above said base, the spacing of said ramp above said base being constant, the forward edge of said ramp being a straight line;

a plurality of separate balls to be moved over said ramp upon said base and in contact with said scoring openings, each said ball being substantially larger in diameter than each said opening, each of said openings being circular;

said ramp being reversible with said ramp having a first ball propelling surface and a second ball propelling surface located on opposite sides of said ramp, said first ball propelling surface adapted to receive balls that are moved



across a hard surface and said second ball propelling surface adapted to receive balls that are moved across a carpeted surface;

a first kick bar depending from said first propelling surface substantially adjacent an end of said ramp, said first kick bar extending substantially the entire width of said ramp;

a second kick bar depending from said second propelling surface, said second kick bar being positioned substantially at the longitudinal center of said ramp and extending substantially the entire width of said ramp; and

a scoop adapted to receive a single said ball, said scoop being attached to a handle, said scoop to be manually moved across the floor to release the retained ball and propel such over said ramp and onto said base.

4,019,740

BOARD GAMES

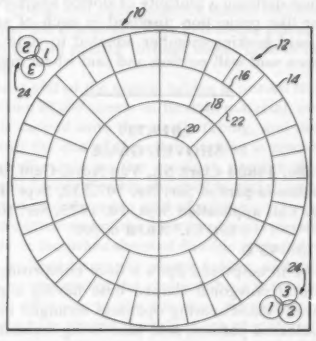
John Anthony Ball; Keith Arthur Warburton, both of Basingstoke, England, and Raymond Donald Carew, Edinburgh, Scotland, assignors to John Anthony Ball, Basingstoke, England

Filed Sept. 10, 1975, Ser. No. 611,883

Claims priority, application United Kingdom, Sept. 16, 1974, 40198/74

Int. Cl.² A63F *3/00*

U.S. Cl. 273—131 KN **11 Claims**



1. A board game for two players comprising a board having a playing area divided into playing spaces, said playing area having a substantially circular boundary and said playing spaces being defined by circles concentric with and of lesser diameter than said boundary and by radii of said circles and said boundary, two similar armies of playing pieces for positioning on said playing spaces and for movement about said playing area by the players whereby each player may take pieces of the other player's army, a non-playing area for each player, each non-playing area being adapted to accommodate a playing piece of that player, and a marker for each player, each marker being adapted to be accommodated on a playing space, whereby either player can move a playing piece of his army from a playing space of said playing area to his non-playing area and denote the playing space from which said playing piece was moved by positioning his marker on said playing space.

4,019,741

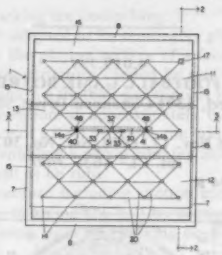
GAME WITH MECHANICAL CAPTURE MEANS

Straud D. Herriman, 229 Kentucky Ave., Danville, Ill. 61832

Filed Dec. 5, 1975, Ser. No. 638,050

Int. Cl.² A63F *3/00*

U.S. Cl. 273—131 BA **6 Claims**



1. A peg-board type game composing a peg-board playing surface having a plurality of spaced vertical holes therein adapted to receive and retain dowels positioned on the bottom of manually movable playing pieces for said game, a frame for supporting said playing surface, said playing surface being divided into at least three components, two of said playing surface components being spaced laterally apart and being essentially horizontal, and the third of said playing surface components being positioned between said two horizontal components and having an upper surface which traverses the space between and rises above the upper surface of said two horizontal playing surfacecomponents, means positioned below said third playing surface component for ejecting the dowels of playing pieces from predetermined holes in said third playing surface component, said dowel ejecting means comprising a lever pivoted between the ends thereof and having, positioned on opposite sides of said pivot, two peg elements, each of said peg elements being adapted for essentially vertical movement upwardly into and downwardly out of one of a pair of said predetermined holes upon a pivoting movement of said lever, so that a dowel of a first playing piece is adapted to be ejected from one of a pair of said predetermined holes by the respective peg element adjacent thereto, upon a dowel of a second playing piece being inserted into the other of said pair of predetermined holes and causing thereby said lever to pivot.

4,019,742

BOARD GAME APPARATUS

Lee W. Thompson, 42 Westbury Ave., Plainview, N.Y. 11803

Filed Dec. 24, 1975, Ser. No. 644,216

Int. Cl.² A63F *3/00*

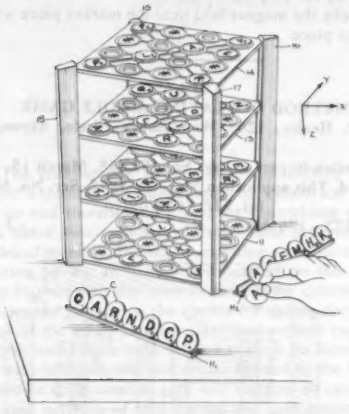
U.S. Cl. 273—134 CA **2 Claims**

1. A board game simulating racing events comprising a board imprinted with a design indicating at least one course for a racing event and starts and finishes of the courses, indicia along each course indicating simulated units of time, said

indicia also extending beyond the finishes of the courses, pieces representing racers to be moved along the courses and means for selecting by chance the number of indicia a piece is to be moved along the course, said selecting means comprising

a first set of cards marked with integers for indicating the number of indicia on a course a piece is to be moved and a second set of cards marked with integers from 1 to 9 indicating respective tenths of a second.

4,019,743
EDIFICE FOR PLAYING WORD GAME
George Castanis, 444 6th Ave., New York, N.Y. 10011
Filed Feb. 26, 1976, Ser. No. 661,772
Int. Cl.² A63F *3/00*
U.S. Cl. 273—135 D **7 Claims**



1. An assembly for playing a three-dimensional word game in which the highest score is obtained by forming words having a fixed number of letters with the highest point value, said assembly comprising:

A a multi-level edifice having a plurality of transparent platforms supported in superposed relation more or less above ground to provide playing levels equal in number to the fixed number, each level having formed thereon a rectangular array of equi-spaced circular playing sites equal in number to the squares of the fixed number, corresponding sites on the several levels being in vertical registration, the majority of the sites having circular wells therein provided with finger holes, said circular sites being interconnected by straight lines in the X, Y and diagonal directions to indicate the straight line directions in which words may be formed on each level, the remainder of said sites being integrally provided with permanent discs carrying stars to indicate "wild" spaces; and

B a bank of disc-shaped playing chips, each having a letter thereon associated with a numeral representing a point value, said chips having a diameter slightly smaller than that of said wells and being receivable therein to create words having said fixed number of letters in a straight line in the X, Y and diagonal directions across any level, and in the Z and diagonal directions passing through said levels, whereby words may be formed in three dimensions, said chips being removable from said wells by inserting a finger in said finger holes.

4,019,744
MULTIPLE BINGO GAME APPARATUS
Stephen J. Pizur, Sr., 905 Oak Ave., Barnesboro, Pa. 15714
Filed Jan. 5, 1976, Ser. No. 646,589
Int. Cl.² A63F *3/06*
U.S. Cl. 273—135 B **11 Claims**

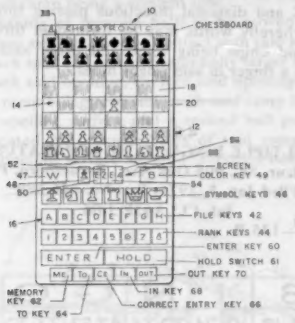
B		I		N		G		O	
4	13	19	24	32	34	47	53	73	70
13	1	29	16	34	31	47	46	67	62
8	10	22	17	42	40	51	55	69	67
7	2	17	26	39	36	52	45	72	61
10	15	18	23	Free		48	57	72	64
5	6	25	21	Space		46	53	74	66
6	6	26	22	40	42	50	47	67	68
4	12	22	28	41	44	57	55	70	71
7	7	27	26	48	35	49	57	65	62
1	5	30	25	40	45	54	56	60	72

1. An improved bingo game including; means for playing up to four games simultaneously on one card, means for marking the numbers called off by the game master for the individual games being played up to four without overlap or confusion by the players, the means for playing up to four games simultaneously on one card including a card with each of the usual twenty-four numbered squares divided into four quadrants and with each of the four quadrants within each square being appropriately numbered, and the four numbered quadrants of each square color coded differently from each other, and the same color coding is used for the corresponding quadrants in all of the other squares.

4,019,745
ELECTRICAL CHESS GAME
Enrique Mustelier, 307 Bird Road, Coral Gables, Fla. 33134
Filed Oct. 29, 1975, Ser. No. 626,977
Int. Cl.² A63F *3/02*
U.S. Cl. 273—136 A **1 Claim**

1. A chess game apparatus comprising: a chessboard matrix of ranks and files of electrically operable optical display cells; each of said cells being configured to selectively display at least twelve states in the form of symbols generally in the shape of the six types of chessmen of each of two colors in response to a coded digital input signal; board position memory means coupled to said cell matrix and organized for storing and supplying said digital input signal for each cell corresponding to the state of each cell; input and keyboard means coupled to said board position memory means for commanding a desired change of position of said cell matrix by designating the rank and file of any of said cells, the chessmen symbol currently displayed at said designated cell, and the rank and file of the cell to which the symbol at said designated cell is to be moved, said keyboard means comprising: a set of eight rank

keys in one to one correspondence with the six types of chessmen symbols; and a set of two color keys in one to one correspondence with said two colors of chessmen; said chess game apparatus further comprising a move memory means fed by said keyboard means for storing a sequence of the last previ-



ous changes of position of said cell matrix; said keyboard means including a memory key coupled for enabling transfer of information from said move memory means to said board memory means to enable sequentially undoing moves in response to each actuation of said memory key.

4,019,746

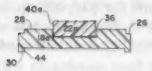
SET OF GAME PIECES

Herbert K. Hare, R.F.D. No. 1, Box 90, Hillsboro, N.H. 03244

Filed May 19, 1976, Ser. No. 688,072

Int. Cl.² A63F *3/02*

U.S. Cl. 273—137 AB **5 Claims**



1. A game comprising two sets of playing pieces, each of the playing pieces comprising one of said two sets being variantly colored from each of the playing pieces comprising the other of said two sets, a plurality of attachment pieces, each of said plurality of attachment pieces being removably engaged within a first cavity in a first lateral surface in the playing pieces of said one of said two sets and in the playing pieces of said other of said two sets, stacking means for stacking a first of said playing pieces to a second of said playing pieces, said second of said playing pieces being disposed above said first of said playing pieces when said each of said plurality of attachment pieces are removed from said first cavity disposed within said first lateral surface of said first of said playing pieces, said first cavity residing at the center of said first lateral surface, said first lateral surface bounded by a circular marginal edge, a playing piece wall, said playing piece wall substantially defining a cylindrical surface and normal to said first lateral surface, the lowermost marginal edge of said playing piece wall defining a second lateral surface, said each of said plurality of attachment pieces having a disc-like shape, the thickness of said disc-like shape being greater than the depth of said first cavity, the diameter of said first cavity being greater than the diameter of said disc-like shape.

4,019,747

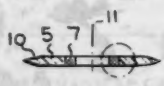
MAGNETIC BINGO MARKERS

Antonio Chuilli, Colonial Apt., 31 Vine St., Weymouth, Mass. 02188

Filed Feb. 6, 1975, Ser. No. 547,470

Int. Cl.² A63F *3/06*

U.S. Cl. 273—137 AE **11 Claims**



1. A marker piece for use on a game board such as the game of Bingo and the like so constructed that the piece can be picked up by the player of the game manipulating a magnet when clearing the board of a plurality of such pieces, comprising, in combination,

a. a transparent disc of substantially uniform thickness and given diameter,

b. a ring of magnetically permeable material,

c. the axial thickness of the ring being no greater than the thickness of the disc.

d. the inside diameter of the ring being no greater than the given disc diameter,

e. the ring being fixedly attached to the disc concentric therewith, and

f. a magnet separate from the game board readily manipulated by the player,

g. whereby the magnet held near the marker piece will pick up the piece.

4,019,748

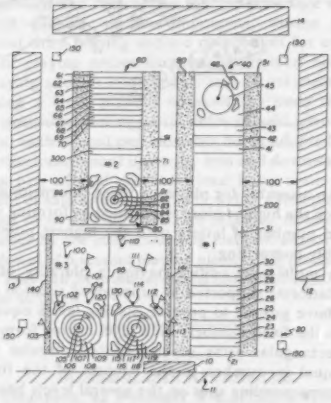
METHOD OF PLAYING A GOLF GAME

Gerald P. Healey, 1265 Wednesbury Circle, Akron, Ohio 44313

Continuation-in-part of Ser. No. 451,455, March 15, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,280

Int. Cl.² A63B *69/36*

U.S. Cl. 273—176 AB **3 Claims**



1. A method of playing a game of golf on a three-hole golf course in which the second and third holes are disposed parallel to the first, each hole having a plurality of teeing areas and graded target areas separated by a fairway area, comprising the steps of;

A. successively hitting five balls from the teeing areas on the

first hole and being apprised of the points awarded based upon the particular graded target area reached by each ball;

B. moving to the teeing areas of the second hole;

C. successively hitting five balls from the teeing areas on the second hole and being apprised of the points awarded based upon the particular graded target area reached by each ball; and

D. moving to the teeing areas of the third hole;

E. successively hitting five balls from the teeing areas on the third hole and being apprised of the points awarded based upon the particular graded target areas reached by each ball, and putting five balls and being apprised of the points awarded based upon the graded target area from which they are putted.

4,019,749

SEALS

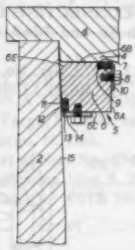
Peter Dawson, Bourne End, and Charles Jack Barrett, Hillingdon, both of England, assignors to Taylor Woodrow Construction Limited, Southall, England

Filed Oct. 23, 1975, Ser. No. 625,153

Claims priority, application United Kingdom, Oct. 24, 1974, 46125/74

Int. Cl.² F16J *15/00*

U.S. Cl. 277—58 **17 Claims**



1. The combination of a hollow substantially cylindrical member a member extending across the cylindrical member to close an end thereof, and a seal for maintaining closure between these two members during radial movement of the cylindrical member; the seal comprising a carrier of ring configuration having an axis, a first surface on the carrier for sliding contact with the inner surface of the cylindrical member, a second surface on the carrier for sliding contact with a surface of the other member, said first surface tapering in a direction away from said second surface to form an acute angle with said axis, and seal means carried by the carrier and disposed to be in contact with said surfaces of said members when said surfaces of said carrier and said members are in contact, the carrier being able to expand or contract to permit said seal means to remain so in contact during said radial movement of the cylindrical member.

4,019,750

BEARING SUPPORT OF THE HEAT-EXCHANGER DISK OF A REGENERATIVE HEAT-EXCHANGER

Klaus Wiegard, Esslingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

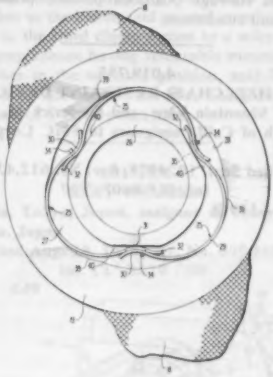
Filed Dec. 11, 1974, Ser. No. 531,795

Claims priority, application Germany, Dec. 12, 1973, 2361697

Int. Cl.² F16F *1/26*

U.S. Cl. 267—160 **14 Claims**

1. A leaf spring element which is adapted to be interconnected with other leaf springs into an annular shape, characterized in that the leaf spring element includes an approximately cylindrical, outwardly curved arcuate portion in the unstressed condition which is adjoined on both sides in the unstressed condition by approximately cylindrical, inwardly curved arcuate portions which have a smaller radius and smaller sector angle compared to the outwardly curved arcuate portion, and in that at least one outwardly directed extension means at one of the inwardly curved arcuate portions and an aperture means in the other inwardly curved arcuate portion into which the extension means of an adjacent spring element is adapted to engage.



4,019,751

MULTI-PURPOSE INFANT'S WHEELED CHAIR

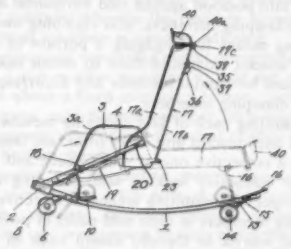
Shinroku Nakao, Yokohama, Japan, assignor to Combi Co., Ltd., Tokyo, Japan

Filed May 20, 1975, Ser. No. 579,202

Claims priority, application Japan, May 30, 1974, 49-62359[U]

Int. Cl.² B62B *3/04*

U.S. Cl. 280—31 **9 Claims**



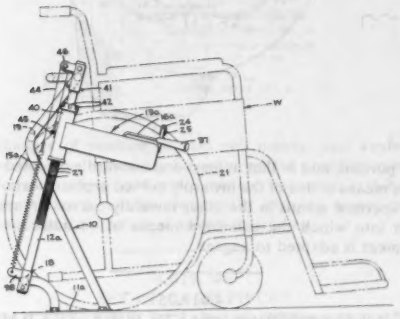
1. A multi-purpose infant's wheeled chair comprising a downwardly arched base member having the front and rear ends directed upwardly, front wheel support rods having one end pivoted to said front end of the base member and rotatably supporting front wheels at the other ends, rear wheel support rods having one end pivoted to said rear end of the base member and rotatably supporting rear wheels at the other ends, sector members provided at said front end of the base member receiving the front end of said base member, chair body support rods having the front ends received in said sector members and the rear ends extending from said sector members toward said rear end of the base member, a chair body slidably supported on the opposite sides by said chair body support rods, a back rest hinged to said chair body for pivotal movement between upright and horizontal positions, a head cover detachably connected to said back rest, a back rest upholding rod pivoted to said rear end of the base member for movement between the upright back rest supporting position

and the horizontal position and engaging means provided on said base member and sector members for engaging said front and rear wheel support rods to selectively maintain the front and rear wheels supported by the wheel support rods in the operative and stowage positions pivoted positions thereof under stabilized conditions.

4,019,752
WHEELCHAIR RESTRAINT DEVICE

Denny Leon, Mountain View, and Frederick M. Stewart, Los Gatos, both of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Sept. 10, 1975, Ser. No. 612,436
Int. Cl.² B60P 7/00
U.S. Cl. 280—179 R **15 Claims**



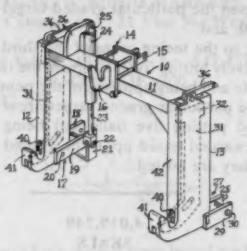
1. A restraint device for maintaining a wheelchair in a stationary position on a floor, for use with a wheelchair having at least two wheels rotatably mounted to the sides of said chair, said device comprising:
   a base member secured to said floor;
   a horizontal member spaced above the floor and secured to said base member whereby the wheels of said chair can be moved into position against said horizontal member;
   a pair of clamping members, said clamping members each including means for engaging a portion of one of said wheels spaced from said floor to retain said wheel between said horizontal member and a corresponding one of said clamping members;
   means mounting each of said clamping members for travel along a path toward and away from said floor and intersecting a respective one of said wheels; and
   means for releasably locking said clamping members to their respective mounting means to selectively lock said clamping members in their said paths in positions engaging said wheels to thereby clamp each of said wheels between said horizontal member and a corresponding one of said clamping members.

4,019,753
ADJUSTABLE THREE-POINT TRACTOR HITCH

Frederick J. Kestel, Rte. 1, Box 44, New Lenox, Ill. 60451

Filed Nov. 13, 1975, Ser. No. 631,741
Int. Cl.² B60D 1/10
U.S. Cl. 280—415 A **6 Claims**

1. An adjustable quick-latch hitch for tractors providing three-point draft link connections comprising
   a. a hitch attachment comprising a rigid frame including a pair of depending legs interconnected by a substantially horizontal support member,
   b. said support member and one of said legs providing connecting brackets adapted to be connected to corresponding draft links of the tractor for connecting said attachment thereto,
   c. a link member pivotally connected at one end to said other of said legs and at its opposite end to a draft link of the tractor,
   d. pivoting means carried by said support member and connected to said link member for pivoting the same relative to its connection to said other of said legs and to

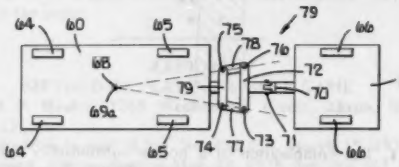


the draft link of the tractor so as to vertically move said other of said legs to vary the plane of said hitch attachment relative to the tractor, and
   e. means provided by each of said legs for releasably connecting said hitch attachment to an implement to be pulled thereby.

4,019,754
VEHICLE CONNECTING DEVICE

John A. Hinckley, 26th St. and 72nd Ave., Lawton, Mich. 49065

Filed Jan. 22, 1973, Ser. No. 325,540
Int. Cl.² B62D 53/00
U.S. Cl. 280—456 R **10 Claims**



1. A device which is for connecting a second vehicle to a first vehicle and which comprises:
   a. a second vehicle;
   b. connecting means for rotatably connecting said second vehicle to a first vehicle which connecting means includes means for causing at least a portion of rotational movement between a first vehicle and said second vehicle to be about an axis which does not intersect said connecting means; and
   c. said connecting means including:
      1. first and second pivot means each for allowing pivoting of a first element with respect to a second element, each of said first and second pivot means having only 1° of rotational freedom;
      2. first maintaining means for maintaining the axes of rotation of said first and second pivot means parallel and not collinear;
      3. means for connection of each of said first elements of said first and second pivot means to a first vehicle;
      4. third and fourth pivot means each for allowintg pivoting of a first element with respect to a second element, each of said third and fourth pivot means having only 1° of rotational freedom;
      5. second maintaining means for maintaining the axes of rotation of said third and fourth pivot means parallel, not collinear, and at a different distance apart than said first and second pivot means;
      6. means for connecting each of said first elements of said third and fourth pivot means to said second vehicle;

7. said second element of said first pivot means connecting to or being integral with said second element of said third pivot means and said second element of said second pivot means connecting to or being integral with said second element of said fourth pivot means;

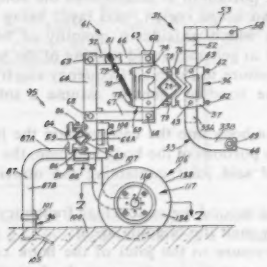
d. said means for connection to a first vehicle including;

1. fifth and sixth pivot means for allowing pivoting of a first element with respect to a second element, each of said fifth and sixth pivot means having only 1° of rotational freedom;
2. means for maintaining the axes of rotation of said fifth and sixth pivot means parallel and not collinear;
3. means for connection of each of said first elements of said fifth and sixth pivot means to a first vehicle;
4. seventh and eighth pivot means for allowing pivoting of a first element with respect to a second element, each of said seventh and eighth pivot means havig only 1° of rotational freedom;
5. means for maintaining the axes of rotation of said seventh and eighth pivot means parallel, not collinear, and at a different distance apart than said fifth and sixth pivot means, each of said first elements of said seventh and eighth pivot means being connected to said first elements of said first and second pivot means;
6. said second element of said fifth pivot means connecting to or being integral with said second element of said seventh pivot means and said second element of said sixth pivot means connecting to or being integral with said second element of said eighth pivot means.

4,019,755
HITCH ASSEMBLY FOR MOUNTING A TRANSVERSE BEAM ON A THREE-POINT HITCH

Fred W. Eisenhardt, Fargo, N. Dak., assignor to Alloway Manufacturing, Inc., Fargo, N. Dak.

Continuation-in-part of Ser. No. 474,048, May 28, 1974, abandoned. This application May 9, 1975, Ser. No. 576,229
Int. Cl.² A01B 59/06
U.S. Cl. 280—490 A **13 Claims**

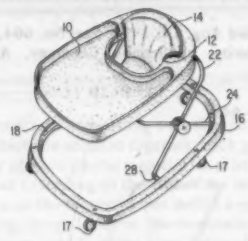


1. Hitch means for mounting a transverse beam on a three-point hitch having a pair of draft links and a control link of of a draft vehicle comprising: a pair of first members, each of said members having a forwardly directed portion and an upright portion, first clamp means for connecting the upright portion of one of said members to the beam, said one member being movable relative to the first clamp means to a selected position, said first clamp means having releasable means holding said one member in the selected position, second clamp means for connecting the upright portion of the other of said members to the beam, said other member being movable relative to the second clamp means to a selected position, said second clamp means having releasable means holding said other member in the selected position, transverse bar means extended between the forwardly directed portions of the first members, means connected to the bar means at the outer end portions thereof to attach the bar means to the forwardly directed portions of the first members, means connected to the outer end portions of the bar means and mounted on the forwardly directed portions of the first members connectable to the draft links of a three-point hitch, a second member having an upright portion and a forwardly directed portion, third clamp means for connecting the upright portion of the second member to the beam, said second member being movable relative to the third clamp means to a selected position, said third clamp means having releasable means holding the second member in the selected position, said forwardly directed portion of said second member being connectable to the control link of a three-point hitch.

4,019,756
BABY WALKER

Hajime Ishida, Tokyo, Japan, assignor to Tomy Kogyo Co., Ltd., Tokyo, Japan

Filed Aug. 18, 1975, Ser. No. 605,518
Int. Cl.² B62B 7/06
U.S. Cl. 280—649 **2 Claims**



1. A walker, comprising:

a top member provided with an opening therein and a seat suspended below said opening;

a bottom member;

means operably connecting said top and bottom members for permitting the walker to be collapsed, wherein said top and bottom members are positioned near each other, and for permitting the walker to be expanded through several positions wherein the distance between said top and bottom members is variably adjusted,

said collapsing and expanding means comprises a first strut having a top portion mounted to said top member for rotation about a fixed axis and a bottom portion consisting of arms, said bottom member including means for mounting said arms of said first strut to slide with respect to said bottom member,

said collapsing and expanding means also comprising a second strut having a top portion and a bottom portion consisting of arms, said top member including means permitting said top portion to slide along the underneath of said top member, said bottom member including means for mounting said arms of said second strut to rotate about fixed points on said bottom member,

said struts having intermediate portions between said top and bottom portions intersecting each other on each side of said walker,

said top member slide means comprises a block, wherein said top portion of said second strut passes through said block and is mounted to rotate about an axis through said block, a rail mounted longitudinally below said top member, said block mounted to slide along said rail, and

means located on said top member for locking said collapsing and expanding means to set said top and bottom members in a desired one of said positions, wherein said locking means comprises a series of teeth along said rail, a threaded post extending outwardly from said block, a knob threaded on said post, and a member intermediately adjacent said rail and said knob provided with teeth complementary in configuration with respect to said teeth of said rail, such that as said knob is threaded on said post

said knob forces said teeth of said member into engagement with said teeth of said rail prohibiting said top portion of said second strut from sliding, thereby locking said collapsing and expanding means in one of said several positions.

4,019,757

FOLDABLE PRAM CHASSIS

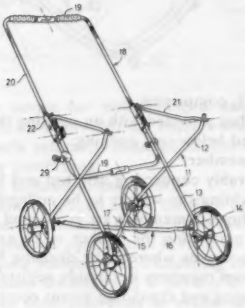
Udo Beger, Landshut, Germany; Gabriel Saillard, and Ari Pasquini, both of Cholet, France, assignors to Etablissements Morellet-Guerineau GmbH & Co. Handels KG, Munich, Germany

Filed Aug. 14, 1975, Ser. No. 604,731

Claims priority, application Germany, Aug. 31, 1974, 2441870

Int. Cl.[2] B62B *11/00*

U.S. Cl. 280—649 9 Claims



1. A foldable pram chassis comprising:

two horizontal carriage body and seat fixing struts, said struts each having a forward end and a rearward end;

two lateral X-shaped frames each including two struts each having an upper end, a respective one of the upper ends of one of said two last-mentioned struts being pivotally connected with a respective one of said forward ends of said two horizontal carriage body and seat fixing struts;

U-shaped plates, one for each said lateral X-shaped frames connected articularly thereto, each of the upper ends of the other of said lateral X-shaped frame struts being pivotally connected with a respective one of said U-shaped plates;

a rectangular slide frame having upper and lower cross-struts each foldable in the middle thereof, the upper cross strut forming a handle grip, said slide frame including longitudinal struts, said fixing struts and said lateral frames, being rotatably mounted about an axle by means of said U-shaped plates; and,

said longitudinal struts and said upper ends of said other of said lateral X-shaped frame struts including operatively associated rotational and pivotal means; whereby said longitudinal struts, said fixing struts and said other of said lateral X-shaped frame struts being pivotal in a longitudinal direction of the pram chassis, and said longitudinal and said other of said lateral X-shaped frame struts being rotatable relative to each other about said longitudinal direction of the pram chassis.

4,019,758

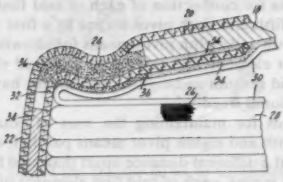
BOOK BINDING PROCESS

William C. Heller, Jr., Milwaukee, Wis., and Leonard Shatzkin, Croton-On-Hudson, N.Y., assignors to William C. Heller, Jr., Milwaukee, Wis.

Continuation-in-part of Ser. No. 335,555, Feb. 26, 1973, abandoned, which is a division of Ser. No. 74,271, Sept. 22, 1970, Pat. No. 3,370,806. This application Mar. 8, 1976, Ser. No. 665,007

Int. Cl.[2] B29C *19/02;* B42D *1/00*

U.S. Cl. 281—21 R 5 Claims



1. An improved process of forming a bound book of conventional construction by affixing the end papers and crash of a body of leaves inside the covers of the case, said end papers and crash and covers having portion suitable for being brought into abutment to form a joint having a first region defined by the end papers and boards of the covers and having a second hinge region which is subjected to stress during use of the book, said process employing conventional book binding paste in said first region and a solidifiable flexible thermoplastic bonding agent meltable to assume a viscid state of short duration responsive to exposure to a high frequency electric field in said second region, said process comprising the steps of:

applying conventional book binding paste to an abuttable portion of at least one of the body and case in the first region of the joint;

applying a layer of the bonding agent in liquid form to an abuttable portion of at least one of the body and case in the second hinge region, said layer being applied in a thickness which provides a quantity of bonding agent sufficient to generate rapid melting of the bonding agent upon exposure to the high frequency electric field;

allowing the bonding agent to assume a solid, nonviscid state;

inserting the body into the case to form the joint from the abuttable portions of the body and case, the second hinge region of said joint containing the nonviscid bonding agent;

exposing the second region to a high frequency electric field to rapidly melt the bonding agent;

applying pressure to the joint of the book containing the bonding agent during the period of viscidness of the bonding agent to bring the abutting portions of the joint into bonding contact to effect an attachment and to reduce the thickness of the bonding agent and the generation of heat in the bonding agent; and

allowing the conventional book binding paste to dry while said joint is held in position by the bonding agent.

4,019,759

INDEXING SYSTEM

Bernard M. Stanton, 4605 Ocean Front Ave., Virginia Beach, Va. 23451

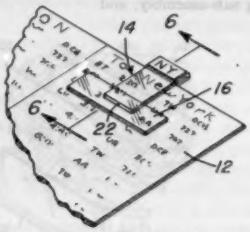
Filed Jan. 20, 1976, Ser. No. 650,709

Int. Cl.[2] B42F *22/00*

U.S. Cl. 283—42 9 Claims

1. In a multiple page book, an index system comprising index tabs associated with selected pages of the book, and mounting means removably securing each tab on the associated page, each of said index tabs comprising a flat strip of

transparent material, each tab overlying one edge of the associated page and projecting both outwardly and inwardly of said one edge, said tab terminating in an inner end inwardly spaced from said one edge, said mounting means comprising transparent adhesive tape overlying and affixed to said inner end and the portion of the tab immediately adjacent thereto,



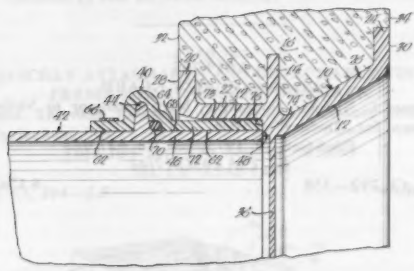
said tape projecting inwardly beyond said inner end and being secured to the associated page, thereby fixing said tab to the page in a manner whereby the tab can pivot upwardly away from said page about the inner end for a complete exposure of said tab, without stripping of that portion of the tape inward of the inner edge, to enable a stripping of the tab from the page secured tape and a repositioning of the tape on the page.

4,019,760

DEVICE FOR CONNECTING CONDUIT TO A MANHOLE OR THE LIKE

Kenneth F. Streit, Mount Prospect, Ill., assignor to Phone-Ducs, Inc., West Chicago, Ill.

Filed Jan. 27, 1975, Ser. No. 544,379
Int. Cl.² E04C 1/39
U.S. Cl. 285—3 **18 Claims**



1. A device suitable for connecting a conduit section having a longitudinal axis to a manhole having a vertical wall, comprising:

an adapter having inner walls and at least one outwardly disposed rib, said adapter being embedded in the wall of said manhole with each said rib preventing movement of said adapter perpendicularly to said manhole wall, said adapter having a first end portion directed toward said conduit,

said conduit having a first end portion with an outer surface,

a coupling sleeve juxtaposed to said outer surface of said conduit along said first end portion of said conduit,

mens for claimping said coupling sleeve to said conduit,

cooperating rib and recess means on said sleeve and said conduit means for preventing longitudinal movement of said coupling sleeve relative to said conduit.

said first emnd portion of said adapter having an inside transverse dimension which is greater than the outside transverse dimension of said coupling sleeve along said first end portion of said conduit when said coupling sleeve is juxtaposed to said conduit,

sealing means for securing said coupling sleeve to said adapter along said first end portion of said adapter,

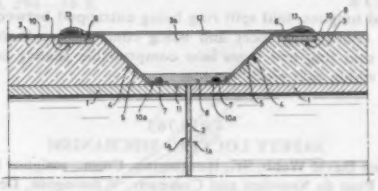
said first end portion of said conduit and said coupling sleeve being insertable into said first end portion of said adapter for securement thereto to connect said conduit to said manhole.

4,019,761

CONNECTION FOR FOAM INSULATED PIPES

Gerrit Heidemann, Oldenzaal, Netherlands, assignor to Industriele Onderneming Wavin N.V., Zwolle, Netherlands

Filed Jan. 7, 1972, Ser. No. 216,052
Claims priority, application Netherlands, Jan. 8, 1971, 7100216
Int. Cl.² F16L 59/14
U.S. Cl. 285—47 **3 Claims**



1. A pipe connection comprising two aligned pipes having opposed ends which are secured together, each pipe including an external layer of foam plastic material thereon, said layer of foam material not extending to the end of the respective pipe so that the layers on the secured pipes define a space therebetween, a finishing cover layer of thermoplastic material on each said foam layer, said finishing layer being of substantially uniform thickness, an elastic sealing ring mounted on the finishing layer on each pipe proximate the end thereof, a sleeve enclosing said space and having ends surrounding the rings, said sleeve being heat shrunk onto the finishing layers to compress the sealing rings, said finishing layer of thermoplastic material tending to creep under the pressure applied to the sealing rings, and a ring of rigid material embedded in each layer of foam plastic material underneath the finishing layer in the region of the associated sealing ring to prevent deformation of the finishing layer and presserve the seal thereat, said ring being cylindrical and having a rectangular cross-section of greater thickness than the finishing layer with opposed parallel side surfaces in abutment with the foam plastic material in which it is embedded, a bottom surface resting on the foam plastic material, and an upper surface flush with the upper surface of the foam layer and in contact with said finishing layer.

4,019,762

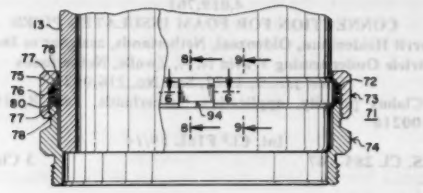
RAINTIGHT CONNECTOR FOR ELECTRICAL CONDUIT

Jonah Eidelberg, Huntington Station; Thomas Mooney, Mount Sinai, and Richard A. Bauer, Mastic Beach, all of N.Y., assignors to I-T-E Imperial Corporation, E. Farmingdale, N.Y.

Continuation-in-part of Ser. No. 501,084, Aug. 27, 1974, abandoned, which is a continuation of Ser. No. 297,657, Oct. 16, 1972, abandoned. This application Apr. 11, 1975, Ser. No. 567,378
Int. Cl.² F16L 19/08
U.S. Cl. 285—340 **5 Claims**

1. A connector device for an electrical conduit comprising first and second collars having mating inner and outer threaded sections and inner axially spaced confronting faces delineating an annular space, a first relatively soft deformable sealing ring registering with said annular space and a second relatively stiff ring of a resilient metal encircling said first ring and split across the circumference thereof to form confronting end faces and including tongues of reduced width directed toward each other and extending from said end faces, said first

ring having a protuberance extending radially outwardly therefrom into the circumference of said second ring and disposed between said ring end faces, said protuberance having a longitudinal bore peripherally aligned with and engaged



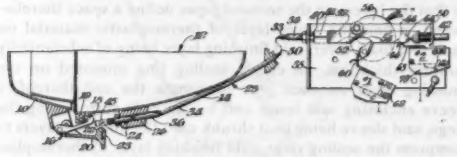
by said tongues, said split ring being entrapped between said collar confronting faces and being compressible thereby to bring said ring end faces into compressible sealing engagement within said protuberance.

4,019,763

SAFETY LOCKING MECHANISM

William David Webb, Sr., Huntington, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 21, 1976, Ser. No. 651,116
Int. Cl.² E05C *3/06, 13/04*
U.S. Cl. 292—207 **13 Claims**



1. A safety locking mechanism for a closure assembly on a compartment housing a centrifuge rotor to be protected against, said rotor having a driving motor, said mechanism having a mechanical linkage positionable to lock and unlock said closure assembly when said assembly is in a lockable position comprising, in combination,

driven means connected to position said mechanical linkage to lock and unlock said closure assembly,

prime mover means for driving said driven means and hence said mechanical linkage in a first sense to a first position when said rotor is stopped;

spring means for driving said driven means in a second sense opposite said first sense to a second position to lock said closure assembly when said assembly is in said lockable position, and

first sensing means electrically coupled to said motor and responsive to said driven means being in said second position for enabling said motor.

4,019,764

CLAMPING DEVICE ADAPTED TO CLAMP PLATE-LIKE MEMBERS

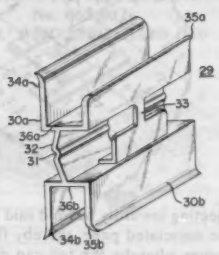
Kouichi Okamura, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 3, 1975, Ser. No. 637,301
Claims priority, application Japan, Dec. 10, 1974, 49-96369; Feb. 17, 1975, 50-22143; Feb. 17, 1975, 50-24074; Feb. 17, 1975, 50-24094
Int. Cl.² E05C *19/18*
U.S. Cl. 292—288 **7 Claims**

1. A clamping device for clamping plate-like members comprising

a. two clamping members having a substantially U-shaped cross sectional configuration;

b. an interconnecting member interconnecting between said two clamping members comprising two web members rigidly connected to said clamping members, a hinge portion formed between said web members for permitting mutual rotation of said web members, each web member and its rigidly connected clamping member forming a clamping sub-assembly; and



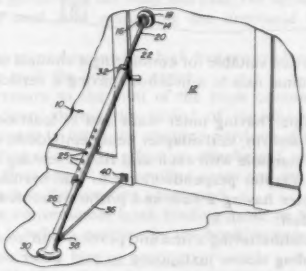
c. an intermediate member formed integrally with one of said two clamping sub-assemblies and extending toward the other clamping sub-assembly a distance sufficient to contact said other sub-assembly when the closed ends of the U-shaped cross sectional configuration are parallel, thereby preventing further rotation of said extended interconnecting member.

4,019,765

DOOR SECURITY GUARD

Vernon A. Nichola, Dodgeville, Mich., assignor to Nichola-Vern, Inc., Dodgeville, Mich.

Filed Oct. 29, 1975, Ser. No. 627,013
Int. Cl.² E05C *17/44*
U.S. Cl. 292—338 **6 Claims**



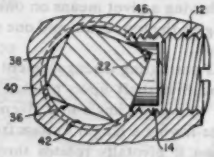
1. A security guard device for a door mounted in a doorjamb; a main adjustable body structure, second adjustable means provided thereon for permitting a fine adjustment of the device, means for attaching the device to a door, and further means for engaging the floor to thereby prevent the door from being opened, still further means to prevent the means for engaging the floor from slipping on same, and the means for engaging the floor including a floor-engaging foot and the still further means preventing slipping being an additional member of solid material attached between the foot and the doorjamb.

4,019,766

SETTING MEANS FOR DOORLOCK ASSEMBLIES

Andrew D. Hall, David's Hill Road, Bedford Hills, N.Y. 10507

Filed Oct. 20, 1975, Ser. No. 623,770
Int. Cl.² E05C 19/00
U.S. Cl. 292—350 12 Claims



1. In a door handle mechanism having a threaded operating shaft with a polygonal cross-sectional shape, a handle threaded onto one end of the shaft, a tapped hole in said handle communicating with the peripheral side surface of the operating shaft, and setting means, including a threaded member, for threading into the tapped hole and into engagement with the peripheral side surface of the shaft to secure the handle on the shaft against rotation, the improvement in the setting means comprising:

a. a shaft engaging member positioned at the leading end of the threaded member for engaging against the side surface of the shaft upon rotation of the threaded member into said tapped hole, said engaging member including:

1. locking means for engaging against one of the corners of the side surface of the shaft for holding the handle against rotation with said corner facing into said tapped hole; and

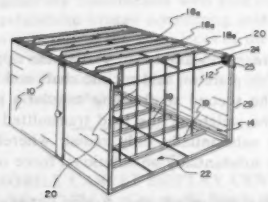
b. coupling means for rotatably attaching the shaft engaging member to said threaded member.

4,019,767

QUICKLY ATTACHABLE AND DETACHABLE TINE FRAME FOR A TOBACCO BOX RACK

Dalma Therman Edwards, and Gene Strickland, both of Springhope, N.C. 27882

Filed July 22, 1976, Ser. No. 707,689
Int. Cl.² A24B 1/08
U.S. Cl. 294—5.5 9 Claims



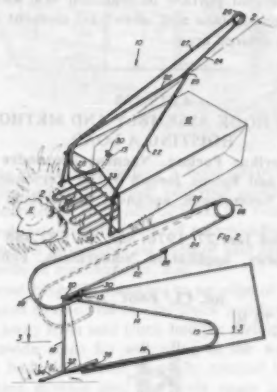
6. A quickly attachable and detachable tine frame for attachment to an open top tobacco box rack for storing and curing tobacco leaves, the box rack being of a type having a bottom, an open top, a pair of opposite sides, and a pair of opposite ends, each of the ends of said pair of ends having a top transverse retaining member connected between said opposite sides, said tine frame having rigid hooking members at opposite ends thereof for sliding engagement beneath the top transverse retaining members at the opposite ends of the box rack for quickly attaching and detaching said tine frame to said box rack over said open top, said tine frame being attachable to said box rack by first sliding the hooking members at one end of the tine frame under the top transverse retaining member at one end of the box until the hooking members at the other end of the tine frame clear the transverse retaining member at the other end of the box rack, lowering the other end of the tine frame until the hooking members at said other end of the tine frame are at a level to just slide beneath the top transverse retaining member at the other end of the box rack, and sliding said tine frame at said level toward the other end of the box rack until said hooking members at said other end of tine frame are engaged under the top retaining member at the other end of the box rack.

4,019,768

DEVICE FOR SANITARY PICKUP OF GROUND DEPOSITED EXCREMENT

Melvin L. Niece, Lakeview, Ohio, assignor to NBS Incorporated, Huntsville, Ohio

Filed Nov. 5, 1975, Ser. No. 629,615
Int. Cl.² A47F 13/06
U.S. Cl. 294—19 R 8 Claims



1. A device for sanitary pickup of ground deposited excrement comprising; a frame structure for supporting a conventional type bag in an open position thereon, a handle attached to said frame structure, hook means associated with said handle to positively yet releasably retain the open bag on said frame and also to positively release the bag, and further means attached to said frame for contacting excrement to be picked up, the means associated with the handle to positively yet releasably retain the open bag includes two rod portions connected by a convolute spring portion at on end of said rod portions and the other end of one of the rod portions having a bag engaging hook thereon, the convolute spring permitting a releasing action of the bag by the hook when the rod portions are squeezed together by a user of the device.

4,019,769

SCREEN GRIPPER

Arnold J. Filion, Apt. 308 1397 Beacon St., Brookline, Mass. 02146

Filed Jan. 19, 1976, Ser. No. 650,529
Int. Cl.² A47F 13/06
U.S. Cl. 294—19 R 7 Claims

1. A hand-operated tool for use in removing and replacing grease screen and trap elements positioned at elevated locations in frame means for holding said elements in operative position, said tool comprising,

an elongated member having a hand gripping portion and carrying an element gripping and moving end spaced from said hand gripping portion,

said gripping and moving end comprising first means for engaging a first portion of said element and moving said

element to a release position to release a margin of said element from said frame means, and second means for supporting a second portion of said element by underlying said second portion to maintain said element in a predetermined plane and allow said element to be relocated to a desired area.

4,019,770

HOISTING HOOK ASSEMBLY AND METHOD FOR HOISTING A LOAD

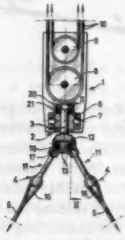
Cornelis Frederikus Poelma, Nuenen; Alexandre Horowitz, Eindhoven, and Petrus Joseph Marie Verschure, Amsterdam, all of Netherlands, assignors to Varitrac A.G., Zug, Switzerland

Filed Jan. 27, 1976, Ser. No. 652,888

Claims priority, application Netherlands, Feb. 3, 1975, 7501270

Int. Cl.² B66C *1/14*

U.S. Cl. 294—78 R **9 Claims**



1. Hoisting hook assembly for hoisting a load by a plurality of load ropes comprising a block, a hoisting element on said block comprising a shaft, said shaft being rotatable around its vertical axis and supported in said block, said shaft further comprising a plurality of means for attaching the load ropes to the hoisting hook assembly, each of said means being rotatably attached to said shaft and capable of swinging about a center line situated in a plane perpendicular to said shaft.

4,019,771

RELEASABLE CONNECTOR HAVING IMPROVED LOAD CARRYING AND RELEASING CAPABILITY

George R. Perez, Alexandria, Va., assignor to AMF Incorporated, White Plains, N.Y.

Filed May 20, 1976, Ser. No. 688,215

Int. Cl.² B66C *1/34*

U.S. Cl. 294—83 R **8 Claims**

1. In a releasable connector apparatus the combination comprising,

first and second rigid side plates,

means including first and second shafts for maintaining said side plates in spaced parallel relationship,

means extending between said side plates for attaching said apparatus to support means,

said first and second shafts extending between the side plates at respective regions on opposite sides of a transverse plane through the central regions of the side plates,

the second one of the shafts being freely rotatable,

pivot arm means extending outwardly from the second shaft and between the side plates,

a fulcrum plate having a pivot means on one end region for pivotally engaging the top region and one side region only of the first shaft,

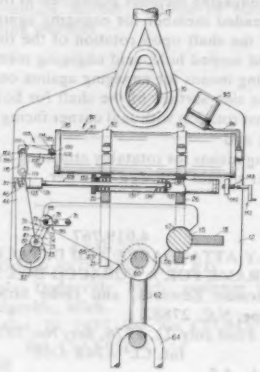
said pivot means permitting disengagement of the fulcrum plate from the first shaft upon pivotal rotation of the fulcrum plate by a given angle in a given direction,

the fulcrum plate having a length to pass freely by the second shaft when it pivotally rotates through said given angle in said given direction,

a cam surface in the second shaft,

elongated latch means pivotally engaging said cam surface on one end and pivotally engaging the opposite end of the fulcrum plate,

means for attaching a load to the fulcrum plate at a location thereon closer the first shaft than the second shaft, whereby the first shaft carries a major portion of said load,



said latch means releasably supporting the opposite end of the fulcrum plate on said second shaft and the cam surface in the second shaft being angularly positioned to receive the weight of the load transmitted thereto in a direction substantially only radial, whereby said load produces substantially no rotational force on the second shaft,

spring loaded means coupled to the outward end of the pivot arm means for applying a force to rotate the pivot arm means toward the fulcrum plate and rotate the second shaft to disengage the latch means therefrom,

releasable restraining means for restraining said spring loaded means and thus preventing rotation of the pivot arm means, and

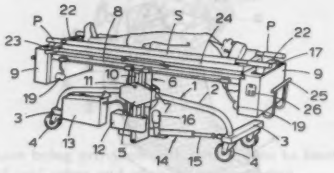
release means operable to release said releasable restraining means for permitting said spring loaded means to rotate the pivot arm means and rotate the cam surface by an angle sufficient to cause the latch means to freely release from the cam surface,

said fulcrum plate being pivoted in said given direction about the first shaft by the load upon release of the latch means and pivoting through said given angle to fall free of the first shaft and away from the side plates.

4,019,772
HOSPITAL TROLLEYS

Norman John Lee, London, England, assignor to Matburn (Holdings) Limited, London, England

Filed Aug. 27, 1975, Ser. No. 608,171
Claims priority, application United Kingdom, Feb. 7, 1975, 5289/75
Int. Cl.² A61G 1/00
U.S. Cl. 296—20 3 Claims



1. A hospital transfer trolley comprising a wheeled undercarriage; a left ram mounted on the undercarriage and movable up and down with respect to the undercarriage, said left ram being tiltable about a horizontal pivot; an upper frame mounted on the left ram and means to raise, lower, or tilt said frame selectively in response to varying positions of the ram, the upper frame having parallel end pieces sufficiently transversely spaced from each other to receive therebetween a hospital bed, operation table or trolley, opposed tracks in the end pieces, the end pieces being provided with lift members which can be raised or lowered with respect to the end pieces; a patient supporting element which can be inserted in the opposed tracks in the end pieces said element being movable to and from a position in which it is supported below a stretcher or the like supported by the lift members in a raised position; power means for selectively raising, lowering or tilting the ram, and power means for selectively raising and lowering the end pieces and wherein said undercarriage is U-shaped and comprises an elongated beam, two substantially parallel wheeled end pieces on which the ends of said beam are supported, a first central support column secured to said beam, a second support column pivotally mounted in said first support column and tiltable about a horizontal axis, a lift ram movable up and down within said second support column, an upper frame carried at the top of said lift ram, said upper frame including a side beam and parallel end pieces providing a U-shape generally coincidental with that of the undercarriage, and extendable braces connecting said pivotable support column with one of the end pieces of the undercarriage, and means for selectively extending or retracting said brace thereby to lift said second support column and also the upper frame about a horizontal axis.

4,019,773
MOBILE CARPET DISPLAY CENTER

Floyd W. Vehling, 7234 E. Coronado Road, Scottsdale, Ariz. 85257

Filed Jan. 5, 1976, Ser. No. 646,847
Int. Cl.² B60P 3/02
U.S. Cl. 296—21 2 Claims

1. A self contained trailer for the promotion and selling of rolled merchandise such as carpet comprising:

a trailer having a wheel mounted trailer bed, a roof spaced from and mounted on said bed by substantially vertically positioned posts, and side and end members,

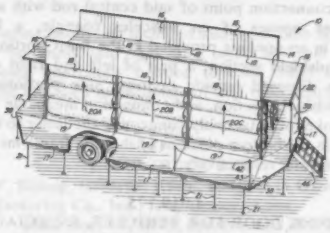
each of said side and end members comprising a plurality of flaps part of which are hingedly mounted adjacent the edges of said bed and the remainder hingedly mounted adjacent the edges of said roof, whereby when said flaps are rotated to a substantially vertical position said flaps cooperatively enclose the sides and ends of the trailer,

means for supporting said part of said flaps in a horizontal position when these flaps are rotated to a horizontal position to form a walk around the sides and ends of said bed,

a pair of racks each mounted longitudinally of the bed and each adjacent a different edge of said bed within the trailer for supporting longitudinally of the bed a plurality of substantially horizontally positioned rolls of merchandise,

said racks being spaced from each other to provide a walk space therebetween,

each of said racks comprises at least a pair of sections axially aligned and each section mounting in a vertical array a plurality of substantially horizontally positioned rolls of merchandise,



mounting means comprising a hook-shaped configuration opening upwardly toward said roof provided on each of said sections of said pairs of racks for rotatively supporting and mounting the rolls of merchandise,

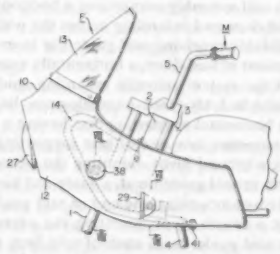
motor means mountable on each of said racks for rotating said rolls of merchandise, and

step means hingedly mounted to an edge of a flap hingedly mounted to one end of said truck bed for pivotal movement away from said truck bed for resting on the ground to provide steps for ascending to the walk around the truck bed, and when pivotally rotated in the opposite direction moving into said walk space for storage purposes.

4,019,774
MOTORCYCLE FAIRING

Takeshi Tsukahara, Kawagoe; Minoru Morioka, Niiza; Yoichi Oguma, Asaka, and Yoshitaka Omori, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 24, 1975, Ser. No. 625,518
Claims priority, application Japan, Aug. 15, 1975, 50-99598
Int. Cl.² B62J 17/00
U.S. Cl. 296—78.1 4 Claims



1. A fairing for a motorcycle having a tubular head post with left and right handlebars, and a pair of left and right side frame members extending rearwardly and downwardly, said fairing comprising: a windshield including a lower section shaped to cover the front portion of the motorcycle to which the fairing

is fitted and an upper transparent section connected to said lower section so as to be upstanding therefrom and disposed in front of the handle bars of the motorcycle, a supporting yoke fixedly secured to the inside of the windshield, an instrument panel supported by said yoke in a position below said upper windshield section on the inside thereof, said yoke comprising a framework including a central rod having a rear end detachably connected to and extending forwardly from said head post, and a pair of side rod portions initially extending laterally from the front end of said central rod in opposite directions and then forwardly together to form a forwardly open U-shaped yoke portion within which said instrument panel is disposed, said side rod portions further extending downwardly and rearwardly from said U-shaped yoke portion for detachable connection at the rear ends to the frame of the motorcycle at respective locations thereon so as to define, together with the connection point of said central rod with said head post, three apexes of an isosceles triangle, a headlight mounted in an opening provided in the front portion of said lower windshield section, a pair of left and right direction indicators disposed outside opposite side portions of said lower windshield section, and connection means on said supporting yoke for detachably connecting the latter to said head post and to the bottom portions of the side frame members of the motorcycle, respectively.

4,019,775

SLIDING DOOR FOR VEHICLES, ESPECIALLY AUTOMOBILES

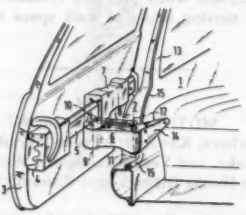
Alfred Grossbach, Tamm, and Ralf Mertin, Sprockhovel, both of Germany, assignors to Lunke & Sohn GmbH, Witten (Ruhr), Germany

Filed Sept. 18, 1975, Ser. No. 614,647

Claims priority, application Germany, Oct. 7, 1974, 2447698

Int. Cl.² B60J 5/06

U.S. Cl. 296—155 **3 Claims**



1. A sliding door assembly for motor vehicles mounting a vehicle door upon a generally vertically oriented side wall of a vehicle body for movement between a closed position flush with the side wall and an open position generally parallel to the side wall, said assembly comprising a horizontal guide bar affixed to said door and extending across the width thereof, a guide head slidably receiving said guide bar to enable relative sliding movement of said door, a horizontally extending parallelogram linkage system swivelly mounting said guide head upon said vehicle body, said parallelogram linkage system comprising a horizontal supporting arm having a pair of ends, a first pivot mounting one end of said supporting arm to said vehicle body, a second pivot mounting the other end of said supported arm to said guide head, a guide rod having a pair of ends, a third pivot mounting one end of said guide rod to said vehicle body, a fourth pivot mounting the other end of said guide rod to said guide head, each of said first, second, their and fourth pivots having a vertical pivot axis and arranged with the distance between said first and second pivots being equivalent to the distance between said third and fourth pivots and with the distance between said first and third pivots being equivalent to the distance between said second and fourth pivots.

4,019,776

REPLACEABLE SEAT COVER

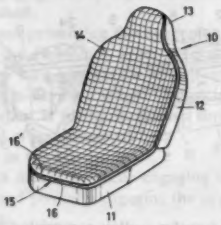
Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 22, 1976, Ser. No. 651,403

Claims priority, application Japan, Feb. 3, 1975, 50-15765[U]

Int. Cl.² A47C 27/00

U.S. Cl. 297—219 **4 Claims**



1. A seat construction comprising:

a. a seat base having a generally horizontal seat portion and a generally vertical back portion, said seat and back portions meeting along a linear line to provide a continuous front surface and a continuous peripheral surface on said seat base;

b. a seat cover covering the entire front surface of said seat base, said seat cover being substantially complementary in shape to the front surface of said seat base and having a periphery coextensive with the peripheral surface on the seat base; and

c. a sliding clasp fastener directly detachably attaching said seat cover to said seat base substantially completely thereabout, said sliding clasp fastener including a pair of stringer tapes carrying along their longitudinal edges rows of interengageable fastener elements, a slider movable along the rows of fastener elements to close and open said sliding clasp fastener, and a pair of end stops secured to opposite ends of said sliding clasp fastener, one of said stringer tapes being secured to and extending along substantially the complete periphery of said seat cover, and the other of said stringer tapes being secured to and extending along substantially the complete peripheral surface of said seat base, whereby the detachable attaching of the seat cover to the seat base is effected completely thereabout.

4,019,777

LUMBAR SUPPORT REGULATING APPARATUS

Masayuki Hayashi, Toyohashi, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jan. 30, 1976, Ser. No. 653,692

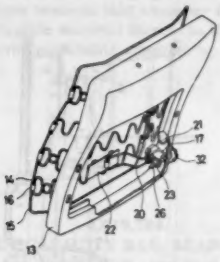
Claims priority, application Japan, Feb. 6, 1975, 50-15594

Int. Cl.² A47C 3/00

U.S. Cl. 297—284 **6 Claims**

1. A lumbar support regulating apparatus comprising a seat back having a rigid frame, spring means provided on said seat back, a torsion spring, pivot means on said frame pivotally supporting said torsion spring, a plate member connected to said torsion spring and disposed between said spring means and said torsion spring to distribute the force of said torsion spring to said spring means and a screw regulating means mounted for rotation on said frame and operatively connected to the other end of said torsion spring whereby upon rotation of said screw regulating means said torsion spring is rotated

about said pivot means to vary the force said one end of said torsion spring exerts on said spring means, said screw regulating means being provided with stop means to limit the movement of said other end of said torsion spring.



4,019,778

DENTAL PATIENTS' CHAIR WITH A PARALLELOGRAM SUPPORTING ARM

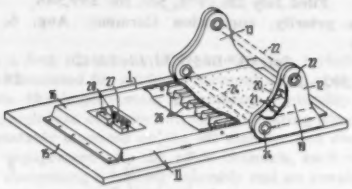
Erich Heubeck, Bensheim, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 407,257, Oct. 17, 1973, abandoned. This application May 30, 1975, Ser. No. 582,163

Claims priority, application Germany, Oct. 21, 1972, 2251809

Int. Cl.² A47C *3/20*

U.S. Cl. 297—346 **3 Claims**



1. A dental patients' chair, comprising a base having a horizontal substantially rectangular base part consisting of a bottom part which consists of a metal plate and a box-shaped cover with edges welded to the bottom part to form an elongated flat hollow box, a seat, two parallelogram supporting arms each having an end carrying said seat, two parallel short side pieces, each of said side pieces consisting of two half shells welded to each other, said side pieces being welded to opposite sides of said hollow box close to an end thereof, bearing axles carried by said side pieces and connected with the other ends of said supporting arms, said side pieces extending upwardly only a short distance from said box to said bearing axles, and struts located within said box and extending parallel to its longitudinal sides for strenthening the box.

4,019,779

LAMINATED ARMREST

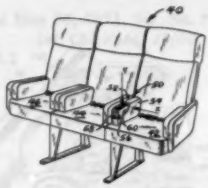
Gerard T. Hogan, Southington, Conn., assignor to Universal Oil Products Company, Des Plaines, Ill.

Division of Ser. No. 537,482, Dec. 30, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,475

Int. Cl.² A47C *7/54*

U.S. Cl. 297—411 **1 Claim**

1. In combination, a multi-passenger seat and an armrest for separating a pair of adjacent seating positions thereon, the armrest having a pair of armrest portions on either side of a rigid central support member, said armrest portions offering greater resistance to loading in a vertical direction than in a sideways direction so that their deflection for a given loading is at least three times greater sideways than downwardly, said armrest portions each comprising a plurality of spaced layers of relatively rigid foam and a plurality of spaced layers of relatively soft foam, said soft foam layers having a thickness not exceeding about one inch and said rigid foam layers being of lesser thickness, said rigid foam layers and said soft foam layers being alternately bonded to each other in vertical planes and attached to each side of said rigid central support member.



4,019,780

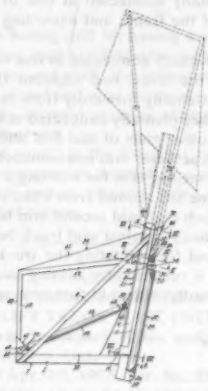
DUMP TRUCK BED

Jerald W. Bishop, Osborne, Kans., assignor to Gilmore-Tatge Manufacturing Co., Inc., Clay Center, Kans.

Filed Nov. 19, 1975, Ser. No. 633,423

Int. Cl.² B60P *1/34*

U.S. Cl. 298—11 **5 Claims**



1. A dump truck bed comprising:

a. a frame including a base adapted to be mounted on a wheeled truck chassis, and one or more rigid posts affixed to said base and projecting upwardly therefrom,

b. a carriage mounted on said frame for vertical movement relative thereto, and including a generally tubular slide mounted telescopingly on each of said posts,

c. a first power means operable to raise said carriage relative to said frame, said carriage elevating means comprising a hydraulic ram extending parallel to each of said posts and interconnecting said post to its associated slide,

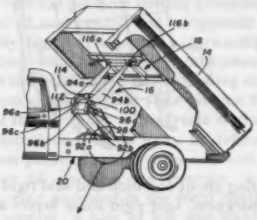
d. a normally upright dump bucket mounted in said carriage for pivotal movement relative thereto on a horizontal axis parallel to and adjacent one of its upper side edges, and

e. a second power means operable to pivot said bucket relative to said carriage to a generally inverted position to dump its contents, said first and second power means being operable independently of each other whereby said bucket may be dumped at any desired position in its range of vertical movement.

4,019,781
HYDRAULIC HOIST FOR PICKUP BED

Louis M. Ray, 11027 Ferguson Road, Dallas, Tex. 75228

Filed Nov. 10, 1975, Ser. No. 630,290
Int. Cl.² B60P 1/16
U.S. Cl. 298—22 J 10 Claims



1. An attachment for converting a fixed bed truck with a passenger cab and hauling bed supported on a frame to a tilting bed truck where the truck bed may be rotated from a horizontal to a tilt position, such attachment permitting the truck cab and bed, when the bed is in the horizontal position, to assume the same relative relationship as before the conversion, comprising:

at least two hinges fixedly attached between the underside of the hauling bed and the rear of the truck frame to permit relative rotation between the hauling bed and frame,

a first arm pivotally connected at one of its ends to the forward portion of the frame and extending forwardly from the frame,

a second arm pivotally connected at one of its ends to the underside of the truck bed adjacent the forward end thereof and extending forwardly from the truck bed,

a coupling member pivotally connected at its opposite ends between said other ends of said first and second arms,

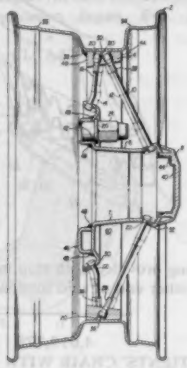
a variable length actuator arm interconnected between said first and said second arm for exerting a lifting force between the frame and second arms when said actuator arm is extended such that said second arm is moved substantially longitudinally against said truck bed to tilt the bed rearwardly, and for retracting the truck bed when said actuator arm is retracted by causing said second arm to move downwardly with said first arm and said coupling member.

4,019,782
AUTOMOTIVE WIRE WHEEL AND MANUFACTURING METHOD

Merlyn R. Reppert, Torrance, Calif., assignor to W. R. Grace & Co., New York, N.Y.

Filed May 2, 1975, Ser. No. 573,870
Int. Cl.² B60B 1/04
U.S. Cl. 301—58 13 Claims

1. In a metal spoked automotive wheel comprising a tubeless tire rim with a drop center, a hub having openings for receiving wire spokes, a plurality of wire spokes extending radially outward from the hub and having threads to cooperate with threaded spoke nipples; the improvement comprising a solid metal felly of substantially uniform solid cross-sectional configuration and comprising an inner annular surface and having nipple receiving holes formed therein at varying predetermined positions and angles for cooperation with the hub

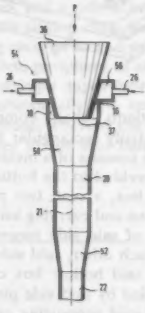


openings to mount the spokes therebetween, and means to integrally join said felly to the rim drop center.

4,019,783
PROCESS AND APPARATUS FOR CONTINUOUSLY CONVEYING PARTICULATE MATERIAL

Lutz Tilo Kayser, Am Bismarckturm 10, Stuttgart, Germany

Filed July 28, 1975, Ser. No. 599,546
Claims priority, application Germany, Aug. 6, 1974, 2437856
Int. Cl.² B65G 53/14, 53/42
U.S. Cl. 302—25 20 Claims



11. A conveyor for particulate material, particularly for continuously transporting coal dust particles towards a combustion chamber, comprising means for conveying a stream of carrier fluid at predetermined pressure along a path; means in the path for reducing the predetermined pressure of the stream, said reducing means including a nozzle having an upstream converging section provided with a discharge gap at which it communicates with the path, and a downstream diverging section for diffusing the stream and generating a low pressure zone at a downstream portion of the path; a chamber downstream of and in communication with said diverging section; and means for admitting particulate material into the presence of the stream passing through said chamber, said admitting means including a container having an outlet opening for centrally admitting particulate material into said chamber in direction of the path, said outlet opening being located in said downstream portion of the path and downstream of

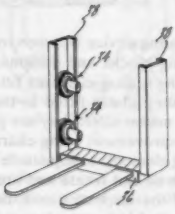
said gap so as to admit the particulate material at said low pressure zone free of agglomerations, and said outlet opening being surrounded by said diverging section so that the stream issuing therefrom towards said chamber forms an envelope about the particulate material therein to thereby entrain and uniformly mix the particulate material.

4,019,784

HIGH-IMPACT CAPACITY BAIL BEARING ASSEMBLY

Eli M. Ladin, Ann Arbor, Mich., and Paul D. Green, Shelbyville, Ind., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed Nov. 12, 1973, Ser. No. 414,803
Int. Cl.² F16C *17/00*
U.S. Cl. 308—6 R 6 Claims



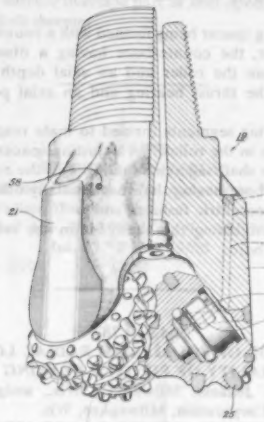
2. In a fork lift vehicle lifting mechanism including a lift member mounted for guided movement along upright guide channels, the improvement comprising a plurality of high impact, high load capacity anti-friction bearing wheel assemblies rotatably mounted on the lift member and disposed in guided engagement with the guide channels, each wheel assembly comprising a bearing assembly and an annular wheel member therearound, each bearing assembly comprising a steel inner race member formed with a radial outwardly facing annular raceway extending around the outside thereof and disposed coaxial with the axis of rotation of said wheel assembly, a steel outer race member circumferentially encompassing and disposed radially outwardly of said inner race member and formed with an inward facing annular raceway extending around the inside thereof coaxial with the axis of rotation of said wheel assembly, said outer race member including an axially and radially extending crack line to permit the adjacent ends thereof to be pulled apart during assembly of said bearing assembly to insert the maximum number of bearing elements between the annular raceways as permitted by the geometry thereof, a plurality of generally spheroidal anti-friction bearing elements confined between said outer and said inner race member and riding in the annular raceways thereof, each said annular raceway formed in axial cross section to provide a two-point contact with each bearing element, the points of contact of each raceway with each bearing element being at points disposed on opposite sides of an imaginary line extending through the center of said bearing element perpendicular to the axis of said bearing assembly, said annular wheel member formed with an axially extending aperture for receiving and circumferentially encompassing said outer race member in an interference fit for retaining and supporting the cracked said outer race member, said wheel member composed of a material having physical characteristics providing greater impact resistance and toughness than either of the race members whereby the impact loads sustained by the lifting mechanism are absorbed within the wheel member and a substantially decreased load is transferred to the bearing elements.

4,019,785

DRILL BIT UTILIZING LUBRICANT THERMAL EXPANSION AND RELIEF VALVE FOR PRESSURE CONTROL

Leon Berthal Stinson, and Edward Milburn Galle, both of Houston, Tex., assignors to Hughes Tool Company, Houston, Tex.

Filed May 30, 1975, Ser. No. 582,506
Int. Cl.² F16C *19/00*
U.S. Cl. 308—8.2 9 Claims



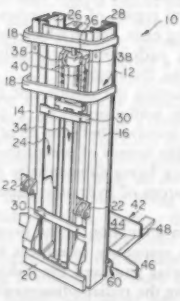
1. In an earth boring drill bit having a rotatable cutter retained on a bearing shaft, a lubrication system, and seal means between the cutter and shaft, the improvement comprising:
lubricant in a closed and rigid cavity of a lubrication system isolated from external pressure except for displacement of the seal means;
pressure relief means in the lubricant system to discharge lubricant responsive to thermally induced expansion;
said lubrication system pressure being controlled by the pressure relief means.

4,019,786

SHIELDED SIDE THRUST ROLLER ASSEMBLY FOR LIFT TRUCK MAST UNITS

William T. Yarris, Brookpark, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Apr. 30, 1975, Ser. No. 573,207
Int. Cl.² F16C *17/00*; B65G *47/00*; B66B *9/20*
U.S. Cl. 308—6 R 8 Claims



1. In a lift truck mast unit including an upright element having a lateral surface, a carriage being arranged for longitudinal movement relative to the upright element and motor

means for moving the carriage relative to the upright element,

a shielded side thrust roller assembly, comprising

a roller suitable for engagement along its periphery with the lateral surface of the upright element, the roller having a bore extending axially therethrough, the carriage forming a bore of different diameter than the bore in the roller and in axial alignment therewith,

an adjusting spacer having an irregular bore, the adjusting spacer being arranged between the roller and the carriage,

a thrust bearing arranged between the roller and adjusting spacer,

the adjusting spacer being formed with a counterbore facing the roller, the counterbore having a diameter slightly larger than the roller and an axial depth sufficient to receive the thrust bearing and an axial portion of the roller,

a shaft having segments formed to mate respectively with the bores in the roller, the adjusting spacer and the carriage, the shaft segments mating with the roller bore and carriage bore having their axes radially offset from each other in eccentric fashion, and

means for retaining the shaft within the roller bore and carriage bore.

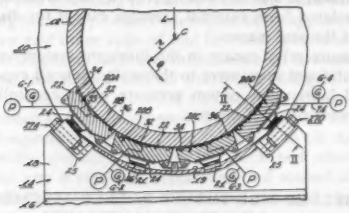
4,019,787
METHOD OF EQUALIZING RADIAL LOAD ON PLURALITY OF PIVOTED BEARING PADS

Raymond C. Jenness, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Division of Ser. No. 508,983, Sept. 25, 1974, Pat. No. 3,984,159. This application Apr. 30, 1976, Ser. No. 682,074

Int. Cl.² F16C *11/02*

U.S. Cl. 308—73 **7 Claims**



1. The method of substantially equalizing the radial load division between a plurality of pivoted bearing pads in a journal bearing of the type having in excess of two bearing pads spaced from each other circumferentially of the journal being supported and lying beneath the circumference of the journal and symmetrically positioned about the vertical axis of the bearing, and in which two of said bearing pads are located in a generally central region of the circumferential span of the plurality of bearing pads, and in which the support surfaces for said two bearing pads are substantially radially fixed, said method comprising the steps of:

a. Radially adjusting the position of the remainder of said bearing pads while supplying a pressurized hydraulic liquid to the interface between all of the bearing pads and the journal, the source of pressurized hydraulic liquid for each interface being substantially hydraulically isolated from the sources of hydraulic liquid for the other interfaces.

b. Obtaining an indication of the pressure of the hydraulic liquid at the respective interfaces between all of the respective bearing pads and the journal; and

c. Discontinuing the radial adjustment of said remainder of said bearing pads when the pressure readings at the respective interfaces of all of said bearing pads, (including said radially fixed bearing pads) are at a predetermined desired value.

4,019,788
SEALING DEVICE

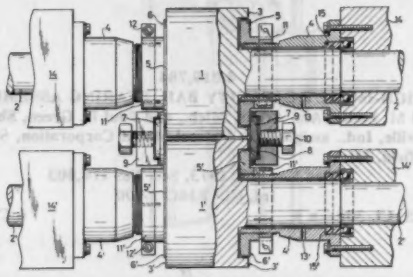
Artur Buchalla, Bobingen, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 21, 1975, Ser. No. 570,226

Claims priority, application Germany, Feb. 13, 1975, 2506091

Int. Cl.² F16C *33/76*

U.S. Cl. 308—187.1 **3 Claims**



1. An end-face sealing device between rotating pairs of rolls supported by bearing blocks and stationary chambers of an apparatus, comprising sealing elements fitted in the end-faces of the rolls and sealing plates fitted in the side walls of the chambers in such a manner that they are pressed on the sealing elements, the improvement being characterized by means to mount the sealing elements in adjustable manner on parts of the apparatus which do not rotate and are stationary in relation to the shaft of the respective roll, the sealing elements being adjustably connected with the non rotating parts by means of supporting bodies, the stationary parts of the apparatus being the bearing blocks of the shafts, the supporting bodies being tubes surrounding the shafts of the rolls, the sealing elements having the shape of flanges, and screw threads adjustably connecting the flanges with the supporting bodies.

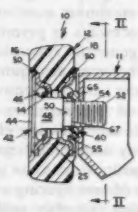
4,019,789
TROLLEY WHEEL

Walter M. Rosin, Grand Rapids; Douglas J. VanDerMeulen, Shelbyville, and Charles C. Frost, Grand Rapids, all of Mich., assignors to C. L. Frost & Son, Inc., Grand Rapids, Mich.

Filed May 10, 1976, Ser. No. 684,627

Int. Cl.² F16C *33/00*

U.S. Cl. 308—190 **16 Claims**



1. An antifriction trolley wheel assembly comprising a plastic wheel having a central opening and an axis therethrough; an annular, metallic, outer bearing race positioned on said wheel adjacent said opening; axial means extending through said opening having an annular, metallic, inner bearing raceway extending about at least a portion of said axial means and spaced from said outer race; a plurality of antifriction means disposed in said space defined between said race and raceway

for rotatably supporting said wheel and outer bearing race with respect to said inner raceway; said outer race including an annular, contoured portion matched to the contour of said antifriction means for rotational support thereof and an annular flange extending radially outwardly from said contoured portion and engaging said wheel, said flange having a noncircular circumferential edge engaging a similarly shaped portion of said wheel to prevent rotation of said outer race with respect to said wheel.

4,019,790

BALL SEPARATOR FOR BALL BEARINGS

Melvin L. Earsley; Stephen L. Earsley, and James L. Earsley, all of 616 E. Slaton Road, Lubbock, Tex. 79404

Filed Apr. 22, 1976, Ser. No. 679,138
Int. Cl.² F16C *19/20*
U.S. Cl. 308—201 **15 Claims**

1. A ball separator for use in a ball bearing which includes an outer race, an inner race, and a plurality of balls coacting with said outer and inner races; said ball separator including an annular base, a plurality of annularly spaced fingers projecting generally axially from said base defining an interrupted annular rib adapted to be received between the outer and inner races of said ball bearing assembly, said rib fingers defining individual annularly spaced ball enclosing pockets; the improvement comprising

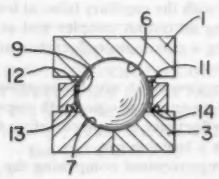
each of said fingers comprising a pedestal for at least two independently flexing ears which are integral extensions of the pedestal; said at-least-two ears being radially separate and partially overlapping, and with the distal ends thereof projecting axially from the pedestal and into respective adjacent pockets, whereby each pocket is partially defined by reentrant ears of its associated fingers.

4,019,791

BALL BEARING RETENTION CONSTRUCTION

Grant M. Loberg, Los Angeles, Calif., assignor to Industrial Tectonics, Inc., Ann Arbor, Mich.

Filed Dec. 10, 1975, Ser. No. 639,287
Int. Cl.² F16C *19/20*
U.S. Cl. 308—217 **16 Claims**



1. A retainer for ball bearings, comprising:

an annulus having radially inner and outer faces;

means defining a plurality of circumferentially spaced openings in said annulus, said openings extending substantially radially through said inner and outer faces;

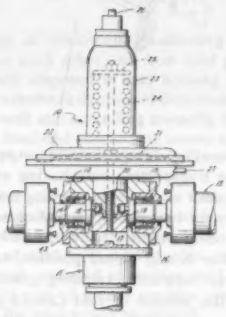
at least one bearing retaining fin or one of said faces, said fin being directed radially and away from said one face of said annulus, said fin extending circumferentially of said annulus in one of tangential and intercepted relation with said openings, one radially extending surface of said fin being flush with and continuing from the perpheral wall of said opening, said fin being bendable axially inward of said annulus to a radial-axial angled position in which its said one surface overlaps part of said opening for retaining of a ball therein.

4,019,792

BEARING ASSEMBLY

Robert C. Monroe, Houston, Tex., assignor to Hudson Products Corporation, Houston, Tex.

Filed Apr. 29, 1976, Ser. No. 681,567
Int. Cl.² F16C *19/00*
U.S. Cl. 308—219 **8 Claims**

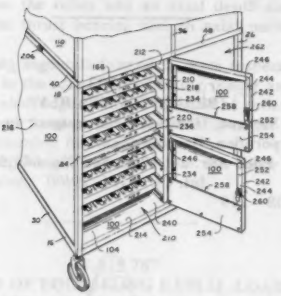


1. In combination with apparatus which includes a bearing housing and a shaft which is disposed concentrically within the housing to provide an annular space between its outer circumference and the inner circumference of the housing, and wherein the outer circumference of the shaft and the inner circumference of the housing have oppositely facing end surfaces at opposite ends of the space; a bearing assembly comprising first and second, bearing elements surrounding the shaft within the space in axially spaced relation, each bearing element including a radially inner part which is rotatable with the shaft and a radially outer bearing part which is held against rotation with the inner part, and a spacer disposed between oppositely facing end surfaces on the outer bearing parts of the first and second bearing elements, the outer part of each bearing element comprising a body having a conically shaped inner surface over which the outer surface of the inner part thereof is slidable, with the conically shaped surface of the first bearing element being divergent in a direction toward the end surface of the shaft, and the conically shaped surface of the second bearing element being divergent in a direction toward the end surface on the housing, an end surface on the inner part of the first bearing element being engaged by the end surface on the shaft, so as to receive the thrust of the shaft, and the other end surface on the outer part of the second bearing element engaging the end surface of the housing, whereby thrust loading is transmitted from the first bearing element through said spacer and outer part of the second bearing element to said housing, and said inner part of the first bearing element comprising a body having a conically shaped outer surface which conforms to and is slidable over the conically shaped inner surface of the outer part thereof.

4,019,793
PHARMACEUTICAL DOSAGE DISTRIBUTION APPARATUS

Paul W. Gerding, 7505 Kilbourn Drive, Fort Wayne, Ind. 46809

Filed Mar. 14, 1975, Ser. No. 558,320
Int. Cl.² A47B 81/00; A61B 19/02; B01L 9/02; A47B 91/00
U.S. Cl. 312—209 6 Claims

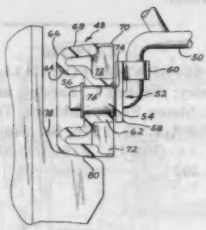


1. A pharmaceutical dosage distribution apparatus comprising at least one transporting case having an opening in one side thereof, a door closing said opening and coupled to said case for movement between open and closed positions, said open position being within said case, first locking means for holding said door in said closed position, said case having a plurality of tray supports extending generally horizontally inwardly into the interior of said case, a plurality of nurse medicine pass trays adapted to be positioned on said tray supports within said case, each of said trays having a thickness dimension and a plurality of compartments therein for receiving a predetermined single dose of medication in a pre-package having a top and bottom, said tray supports being vertically spaced apart, the distance between said tray supports being less than the sum of the thickness of one of said trays and the distance between said top and bottom of one of said pre-packages, each of said trays having adjacent each of said compartments printed materials having patient and drug identification information thereon relative to the pre-package received in the adjacent compartment, a traveling nurse's station including a frame means having at least three frame compartments, a plurality of closure panels secured to said frame means enclosing at least one of said compartments, one of the remaining compartments having at least a floor, said case being slidably received in the remaining of said compartments, second locking means for locking said case to said frame means in its received position in one of said remaining compartment, said case having means thereon for manually lifting and transporting the same apart from said station, said station having a plurality of wheels operatively connected to said frame means, whereby said transporting case can be loaded at a pharmacy with said nurse medicine pass trays having said pre-packages positioned in said compartments and identified for distribution to patients at an institution at a given time, locked and transported to said institution without disloding said pre-packages from said trays, placed in said remaining compartment of one of said traveling nurse's station located at said institution, locked to said station frame means, and used during nurse's rounds.

4,019,794
ROLLER FOR DISHWASHER RACK

Richard A. Rowe, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Feb. 18, 1976, Ser. No. 659,115
Int. Cl.² A47B 97/00; F16C 21/00
U.S. Cl. 312—311 3 Claims



1. A roller, mounted on a dishwasher rack adapted to be movable within a dishwasher tub having a polymeric resinous material covering an interior sidewall and a support, comprising:

a hub having an axle-receiving aperture extending centrally therethrough;

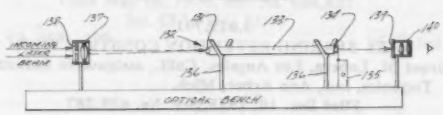
an outer load-bearing rim including: (a) a curved support-engaging surface on the exterior thereof; (b) a peripheral skirt attached to one edge of said load-bearing rim adjacent said rack, said skirt being flexible to provide a load-bearing area that does not damage said polymeric resinous material; and (c) a curved section defining the opposite edge of said load-bearing rim adjacent said dishwasher tub sidewall, said curved section being generously radiused to prevent damage to said polymeric resinous material upon abutting said sidewall; and

an intermediate support means connecting said hub and said outer load-bearing rim.

4,019,795
PASSIVE ALIGNMENT OF LASER MIRRORS

James A. Ringlien, Maumee, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed June 11, 1975, Ser. No. 586,008
Int. Cl.² H01J 9/00
U.S. Cl. 316—1 6 Claims



1. In a manufacturing process for the assembly of a gaseous laser device, said device comprising a laser capillary tube filled with a laseable gas, at least two reflective end pieces being associated with the capillary tube, at least one of the end pieces comprising an output coupler and at least one of the end pieces having a maximum reflectance at the wave length of the laser output,

the process improvement which comprises optically aligning at least one output coupler with respect to at least one maximum reflectance end-piece before the capillary tube is filled with a laseable gas,

said process improvement comprising the steps of:

a. positioning an output coupler at one end of the capillary tube and positioning a maximum reflectance end piece at the opposite end of the capillary tube;

b. passing a laser beam coaxially through the capillary, said laser beam being introduced into the capillary from an

external laser beam source through a reflective end piece positioned at one end of the capillary;

c. and adjusting the end piece positioned at the opposite end of the capillary with respect to the laser beam passing through the capillary such that an optimum optical resonance condition is achieved between the two reflective end pieces positioned at the respective ends of said laser capillary tube.

4,019,796

SEPARABLE CONTACT AND CONNECTION ARRANGEMENT FOR IGNITION CABLES TO A FIXED TERMINAL, FOR EXAMPLE THE DISTRIBUTOR CAP OF A DISTRIBUTOR-BREAKER ASSEMBLY

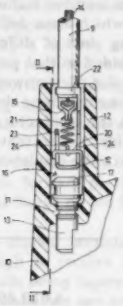
Jörg Issler, and Richard Gerber, both of Stuttgart, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 25, 1976, Ser. No. 717,528

Claims priority, application Germany, Sept. 10, 1975, 2540239

Int. Cl.² H01R *11/30*

U.S. Cl. 339—12 R **19 Claims**



1. Severable contact and connecting arrangement for ignition cables with fixed terminals having

an ignition cable (9), a wire (14) within the cable and forming a movable electrode in the arrangement;

a socket (12) and a fixed electrode (13, 63) located therein and forming a fixed electrode of the arrangement, the movable electrode being axially insertable in the socket for engagement with the fixed electrode,

comprising, in accordance with the invention,

an axially acting contact spring (21, 31) located between the movable electrode and the fixed electrode and forming a current carrying contact means while exerting axially directed bias force between said elements;

and releasable holding means (FIGS. 1–3: 16; FIG. 4: 30, 34, 36; FIGS. 5–7: 40, 41, 43; FIGS. 8–9: 64, 61, 67) releasably positively connecting the cable and the socket, whereby the electrical connection is spring-loaded to effect positive contact even under severe vibration and shock conditions while releasably securing the cable in the socket.

4,019,797

SYSTEM INCLUDING HOUSEHOLD CONNECTOR PLUG FOR SPLIT WIRE RECEPTACLE

Henry W. Praml, 275 South St., Murray Hill, N.J. 07974

Filed Nov. 17, 1975, Ser. No. 632,447

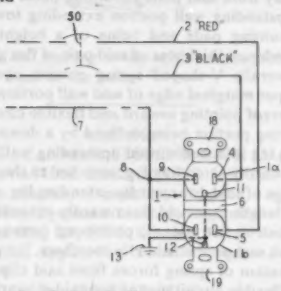
Int. Cl.² H01R *3/06*

U.S. Cl. 339—14 P **10 Claims**

1. A unitary electrical connecting plug constructed to mate with a standard split wire duplex receptacle having two electrically isolated female slots respectively connected to high potential power terminals at substantially equal and opposite potential, two female neutral slots electrically connected together to a neutral terminal at a potential substantially halfway between the potentials of said high potential power terminals, and means comprising one or more slots for connection to ground potential, said plug comprising in combination:

an insulative housing having a rear wall including connecting means to an insulating conduit, side walls and a front wall opposite said rear wall,

electrically conducting ground means rigidly disposed in said housing to extend outwardly in a substantially normal direction from the external face of said front wall and to extend inwardly to conducting means for making ground contact, and



at least one pair of electrically conducting power blades insulated from each other and from said ground means, said pair rigidly disposed in said housing and extending outwardly in substantially normal direction from the face of said front wall and extending inwardly in said housing to separately insulated conducting means constructed for connection to a pair of electrically isolated high potential contacts,

said power blades spaced apart on the external surface of said front face a distance which coincides with the spacing between said two electrically isolated high potential female slots of said split wire duplex receptacle, and constructed and arranged to engage said slots simultaneously as said ground means engages said means comprising a slot for connection to ground.

4,019,798

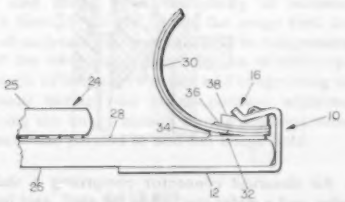
FLEXIBLE ELECTRICAL CIRCUIT CONNECTIONS

Eugene J. Zielinski, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 24, 1976, Ser. No. 669,950

Int. Cl.² H05K *1/12*

U.S. Cl. 339—17 F **2 Claims**



1. In a gas discharge panel having a pair of elongated flat glass plates spacedly joined to form a thin gas discharge chamber, wherein said plates are joined with their long axis transverse, wherein a plurality of conductors extend parallel to the long direction of each plate on the surface of each of said plates and terminate in mounting pads which are exterior of the location wherein said plates are joined, an improved system for the connection of said gas discharge panel to electrical signals which comprises, in combination:

flexible circuit means, having multiple conductors terminating in pads which correspond in spacing to the spacing of said mounting pads on said plate, for carrying electrical signals;

adhesive means for holding the pads of said flexible circuit means in alignment with said mounting pads on said plates;

clip members for securing said flexible circuit means in position by the application of spring forces on said flexible circuit means and on said plates, said clip members each including;

a bottom member underlying said glass plate on the side away from said plate mounting pads;

an upstanding wall portion extending toward said plate mounting pads and being of a height less than the combined thickness of said pair of flat glass plates; and

a generally V-shaped spring portion connected to the upper marginal edge of said wall portion with the notch thereof pointing toward said flexible circuit means, said spring portion being defined by a downwardly extending leg attached to said upstanding wall portion and an upwardly extending leg, attached to the lower marginal edge of said downwardly extending leg, which is shorter in length than said downwardly extending leg; and

force distribution means, positioned between said flexible circuit means and said clip members, for preventing concentration of spring forces from said clip members onto said flexible circuit means and said mounting pads on said plates and for compensating for any surface irregularities, said notch portion of said spring portion being in contact with said force distribution means.

4,019,799

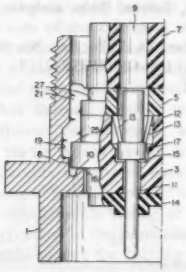
ELECTRICAL CONNECTOR

Alfred Joseph Bouvier, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 11, 1976, Ser. No. 657,124

Int. Cl.² H01R *13/40*

U.S. Cl. 339—59 R **8 Claims**



1. An electrical connector comprising a shell; an insert member and a wafer stacked in the shell, said insert member and wafer each separated from the shell by a space; said insert member and wafer having apertures aligned with one another for receiving respective electrical terminals; retention means carried within the apertures of the insert member for retaining an electrical terminal in each of the apertures; and means for maintaining the insert member and wafer within the shell, said maintaining means comprising a laminate of deformable material disposed between the shell and insert member and between the shell and wafer, the laminate deformed to substantially fill the space therebetween.

4,019,800

UNIPLANAR ELECTRICAL CONTACT

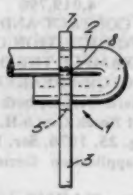
Lucas Soes, Vught, Netherlands, assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 7, 1976, Ser. No. 684,336

Claims priority, application United Kingdom, May 31, 1975, 23731/75

Int. Cl.² H01R *9/08*

U.S. Cl. 339—97 R **3 Claims**



1. An electrical connection between an insulated conductor and an electrical contact, the electrical contact being in the form of a uniplanar member including a pair of spaced arms, opposed edges of which arms define between them a pair of intercommunicating slots of different widths, the insulated conductor being folded so that portions overlap, one portion extending into the slot of narrower width so that the edges of the arms defining the narrower slot pierce the insulation and electrically engage the conductor, and the other portion extending into the wider slot so that edges of the arms defining the wider slot pierce the insulation to provide a strain relief effect.

4,019,801

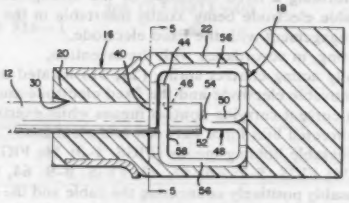
ELECTRICAL SPLICE

Ronald Clarence Hoffman, Williamstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 19, 1976, Ser. No. 650,219

Int. Cl.² H01R *9/08*

U.S. Cl. 339—98 **7 Claims**

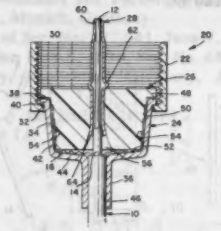


1. A device for electrically splicing two wires together, which comprises: a strip of conductive material with one end being provided with a pair of parallel wire-receiving slots and the other end being provided with a pair of wire-receiving openings and the strip intermediate the two ends being provided with a pre-weakened section, said strip being formed into a four sided frame with the two ends forming a first side with one end adapted to move past another and the pre-weakened section forming a second side opposing and parallel to the first side so that as the sides of the frame perpendicular to the first and second sides are compressed towards one another one end moves past the other end and a pair of wires which may be positioned in the openings are received in the slots with the edges of the slots making electrical contact therewith and further the pre-weakened section becomes deformed and thereby prevents one end from moving back past the other end so that the wires are retained in the slots.

4,019,802
FIELD-APPLIABLE UHF COAXIAL CONNECTOR

Suel Grant Shannon, Harrisburg; Harold Chester Timmins, and Kenneth Earl Gookin, both of Hershey, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 4, 1975, Ser. No. 628,640
Int. Cl.² H01R 17/18
U.S. Cl. 339—177 R 3 Claims



1. A field appliable UHF connector for use with coaxial cable of the type having a center conductor and a braided outer conductor, which comprises:

a. a shell member having a hollow, cup-shaped forward portion and an elongated rearward extension of less diameter than the forward portion, a passageway through said extension and opening into the forward portion, said passageway adapted to receive therethrough a coaxial cable, the walls of the forward portion converging rearwardly at an angle of from about three degrees to about six degrees, further, the forward portion having an outwardly extending radial flange on the leading edge of the forward portion;

b. a generally solid cup-shaped insulating body having a passageway therethrough to receive a contact therein, and further the side walls being tapered inwardly toward the base of the body and having one or more steps thereabout, said body being adapted to be received within the forward portion of the shell member with the braided shield of the coaxial cable trapped therein between with the steps providing points of high force concentration against the braided shield;

c. an elongated center contact seated in the passage of the insulating body and adapted to receive the center conductor of the coaxial cable therein, said contact having securing means thereon comprising an upset intermediate its ends adapted to abut the forward face of the insulating body and the rear end of the contact flared outwardly to frictionally engage the walls of the passage in the insulating body, and further a nose of reduced diameter on its front end for insertion into a socket or the like; and

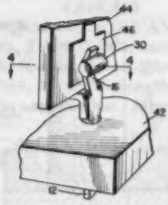
d. a coupling nut rotatably positioned around the shell member and having internal threads therein for being threadably received by a threaded jack or the like.

4,019,803
SOLDER SUBSTRATE CLIP

Mark Samuel Schell, New Cumberland, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 15, 1975, Ser. No. 622,747
Int. Cl.² H01R 9/06
U.S. Cl. 339—275 B 14 Claims

1. A terminal adapted to be soldered to a metal pad comprising a contact arm stamp-formed from thin sheet metal stock having a contact surface adapted to engage the pad, a solder-mounting surface on the other side of the arm from the contact surface and at least one sheared edge extending between said surfaces, a mass of solder metallurgically bonded to the solder-mounting surface and extending to one side of the mounting surface beyond the sheared edge, and a rounded solder globule projecting from the solder mass at the edge across the thickness of the contact substantially to or beyond the contact surface whereby, on positioning of the contact

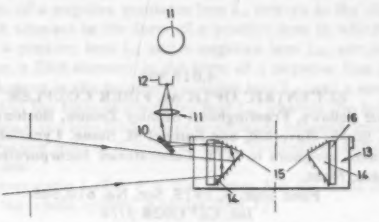


against the pad and melting of the solder mass, molten solder flows from the mass to the pad.

4,019,804
OPTICAL SCANNING SYSTEMS WITH IMAGE CURVATURE CORRECTING MEANS

David Thomas Collier, Dunstable, England, assignor to Hawker Siddeley Dynamics Limited, England

Filed May 29, 1975, Ser. No. 581,871
Claims priority, application United Kingdom, June 10, 1974, 25707/74
Int. Cl.² G02B 27/17
U.S. Cl. 350—7 6 Claims



1. An optical scanning system comprising a rotary scanner, transfer optical means generating a beam that forms adjacent the periphery of said rotary scanner an image of a light-responsive or light-emitting device, optical objective means having a flat image field adjacent said image formed by said beam, said rotary scanner comprising a series of reflectors arranged around the periphery of said scanner and sequentially sweeping said image across said image field as the scanner rotates to generate a raster, and optical correcting means disposed in the path of the beam forming said image which optical correcting means having a surface configured with a multiplicity of incremented steps of such size to adjust the position of said image by a multiplicity of incremental amounts in a direction normal to said flat image field during the passage of each reflector past said field to compensate for curvature of the image introduced by the transfer optical means, the angle of the beam forming said image being maintained constant during said image position adjustments, thereby making the image motion during scanning substantially rectilinear and parallel to said flat image field.

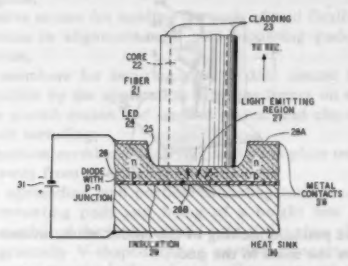
4,019,805
OPTIMIZED PARABOLIC-INDEX OPTICAL FIBER COMMUNICATION SYSTEM WITH INCOHERENT LIGHT SOURCE

Enrique Alfredo Jose Marcatili, Rumson, and Dietrich Marcuse, Lincroft, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 25, 1975, Ser. No. 599,082
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 2 Claims

1. An optical fiber communication system of the type em-

ploying an incoherent light-emitting source having a light-emitting region concentrically mounted directly on the end of an approximately parabolic-index profile optical fiber having



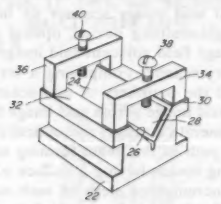
a core surrounded by a cladding material, characterized in that the ratio of the radius of the light-emitting region of said source to the radius of the parabolic-index profile core of the optical fiber is approximately 0.2.

4,019,806

ECCENTRIC OPTICAL FIBER COUPLER

Daniel Fellows, Framingham; Stanley Zemon, Boston; Phillip A. Sturk, Haverhill, and Samuel M. Stone, Lynnfield, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Sept. 4, 1975, Ser. No. 610,505
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C **3 Claims**



1. An optical fiber coupler comprising

a pair of circularly cylindrical optical fiber connectors each having an end of an optical fiber located at one end of the connector at a respective first distance from the axis thereof,

a coupler block having a V-groove channel therethrough to receive and locate the pair of connectors with their one ends in a juxtaposed,opposed relationship, one surface of the V-groove channel being planar and continous over the length of the V-groove, the other surface of the V-groove being divided laterally into two parallel planar segments, the planes of the segments being separated by a second distance which is greater than the difference between the respective first distances, and less than the sum of the respective first distances, and

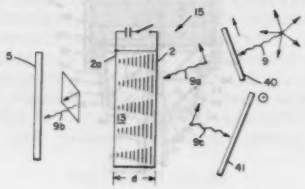
means for firmly seating and retaining each fiber optic connector in the channel and against a respective segment to enable efficient optical coupling between the optical fibers.

4,019,807

REFLECTIVE LIQUID CRYSTAL LIGHT VALVE WITH HYBRID FIELD EFFECT MODE

Donald D. Boswell, Granada Hills; Jan Grinberg, Los Angeles; Alexander D. Jacobson, Topanga, and Gary D. Myer, Reseda, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 8, 1976, Ser. No. 664,776
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC **10 Claims**



1. In a reflective mode alternating current driven liquid crystal light valve of the type having first and second parallel opposed transparent electrode means for application of an alternating electric field across first and second parallel opposed transparent insulating layers which are positioned between and parallel to said first and second electrode means to define in cooperation with an annular spacer member separating said first and second insulating layers an enclosed space containing nematic liquid crystal material, said light valve further having photoconductor means and mirror means positioned between said second transparent electrode and said second transparent insulating layer, said photoconductor means being positioned to receive input writing signal light through said second transparent electrode to spatially and temporally vary the magnitude of said electrode field applied across said liquid crystal material as a function of the intensity of said writing light, the hybrid filed effect mode improvement comprising:

a. means operatively associated with the first of said transparent insulating layers in the absence of an electric field for aligning the axes of the molecules of a first portion of said liquid crystal material adjacent to said first layer in a first direction in a plane which is parallel to said first layer;

b. means operatively associated with the second of said transparent insulating layers in the absence of an electric field for aligning the axes of the molecules of a second portion of said liquid crystal material which is adjacent to said second layer in a second direction in a plane which is parallel to said second layer, the respective orthogonal projections of said first and second directions in any plane which is between and parallel to both said first and second planes intersecting at an acute angle for producing a twisted alignment of the axes of said nematic liquid crystal molecules in the absence of said electric field and a tilted orientation of said axes in the presence of said electric field;

c. means for providing polarized projection light through said first transparent electrode and said first transparent insulating layer to traverse said liquid crystal material contained between said first and second insulating layers and be reflected by said mirror means to re-traverse said liquid crystal material and exit through said first transparent electrode of said light valve, said polarized projection light being subject to changes in polarization state as it traverses said layer of liquid crystal material in both directions, said polarization sate being rotated by said twisted nematic alignment of said molecules of said liquid crystal material in the off state of said field and by the birefringence of said tilted oreintation of said molecules of said liquid crystal material in the on-state of said field; and,

d. means positioned to intercept said light exiting from said first transparent electrode means for blocking all of said projection light exiting from said light valve except that which is in a predetermined polarization state.

4,019,808

ARRANGEMENT FOR A POLYCHROME DISPLAY

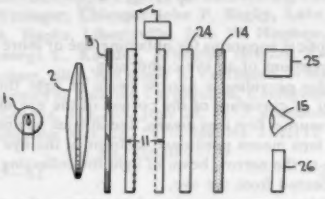
Terry James Scheffer, Wettingen, Switzerland, assignor to Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung e.V., Munich, Germany

Continuation of Ser. No. 477,541, June 7, 1974. This application May 5, 1976, Ser. No. 683,342

Claims priority, application Germany, June 9, 1973, 2329618

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **11 Claims**



1. An arrangement for a polychrome display, comprising in serial association a light source, a linear polarizing filter, at least one electro-optical nematic liquid crystal rotating element adapted to rotate the plane of polarization of a light ray when no electrical potential is applied and to leave the plane of polarization unchanged when potential is applied, and a pleochroic color selective linear polarizer forming an assembly.

4,019,809

ELECTROCHROMIC DISPLAY DEVICE

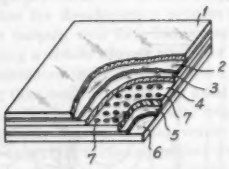
Tsutomu Otake; Hiroshi Takeshita; Akihiko Kouchi, all of Suwa, and Kunihiro Inoue, Okaya, all of Japan, assignors to Kabushiki Kaisha Suwa Seikosha

Filed June 25, 1975, Ser. No. 590,343

Claims priority, application Japan, June 25, 1974, 49-72492

Int. Cl.² G02B 5/23; G02E 1/01

U.S. Cl. 350—160 R **7 Claims**



1. A display device useful as an image converter over the range from X-rays to infra-red and as a memory—non-memory device, comprising in spatial sequence, a first transparent substrate a transparent first electrode supported on said first transparent substrate, a layer of photoconductive material, a layer of insulating material having a multiplicity of openings therethrough, said opening having a maximum diameter of 5 mm and being arranged to produce a halftone effect, a second electrode, and a second transparent substrate, said second electrode being supported on said second transparent substrate and said openings containing electrochromic material making conductive paths between said layer of photoconductive material and said second electrode, said electrochromic material being viologen bromide and said insulating material being between 10 and 1 mm. in thickness.

4,019,810

PHOTOGRAPHIC WIDE ANGLE LENS

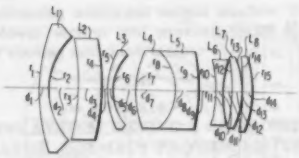
Takahiro Sugiyama, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,599

Claims priority, application Japan, Nov. 18, 1974, 49-132507

Int. Cl.² G02B 13/04

U.S. Cl. 350—214 **4 Claims**



1. A photographic wide angle lens system comprising seven elements composed of eight lenses, said elements consisting of a first element in the form of a negative meniscus lens L_1 convex to the object, a second element in the form of a positive meniscus lens L_2 concave to the object, a third element in the form of a negative meniscus lens L_3 convex to the object, a fourth element in the form of a positive lens in which two lenses, a positive lens L_4 and a negative lens L_5, are joined together, a fifth element in the form of a negative lens L_6, a sixth element in the form of a positive lens L_7, and a seventh element in the form of a positive lens L_8, wherein the radii of curvature r, the lens thicknesses or distance between lenses d, the refractive indices N and the Abbe Numbers ν of the lens system are:

Aperture ratio 1 :2.0, $F = 100$, where F is the focal length of the whole system, Angular field 75°

lens	Radius of Curvature r (mm)	Lens Thickness or Distance d (mm)	Refractive Index N	Abbe No. ν
L_1	r_1= 199.730	d_1= 4.126	N_1=1.49831	ν_1=65.0
	r_2= 68.296	d_2=30.168		
L_2	r_3=-305.836	d_3=24.273	N_2=1.68250	ν_2=44.7
	r_4=-206.318	d_4= 3.710		
L_3	r_5= 85.301	d_5= 4.161	N_3=1.71300	ν_3=53.9
	r_6= 52.914	d_6=23.683		
L_4	r_7= 104.026	d_7=38.455	N_4=1.80610	ν_4=40.9
	r_8= −52.914	d_8=24.481		
L_5	r_9=-196.956	d_9=17.754	N_5=1.72342	ν_5=38.0
L_6	r_{10}=-124.352	d_{10}= 4.161	N_6=1.84666	ν_6=23.9
	r_{11}= 146.676	d_{11}= 8.461		
L_7	r_{12}=-274.954	d_{12}= 8.842	N_7=1.73400	ν_7=51.5
	r_{13}= −77.738	d_{13}= 0.347		
L_8	r_{14}=-1074.933	d_{14}= 9.536	N_8=1.71300	ν_8=53.9
	r_{15}=-115.465			

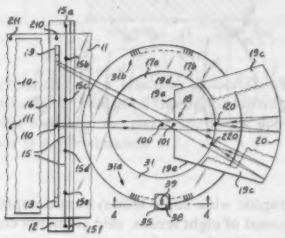
$f_B = 127.640$, where f_B is the back focal length, $F_{1,2,3,4,5,6} = -169.837$, where $F_{1,2,3,4,5,6}$ is the combined focal length of lenses L_1 through L_6, and

the sum of Petzval = 0.168.

4,019,811
OPTICAL SCANNER

Lawrence D. Lorah, Concord; Richard W. Stresau, Somerville; Lawrence B. Lapson, Boston, and Curtis P. van Vloten, Cambridge, all of Mass., assignors to Rapifax Corporation, Fairfield, N.J.

Continuation of Ser. No. 322,002, Jan. 8, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,135
Int. Cl.² G02B 25/00
U.S. Cl. 350—274 20 Claims

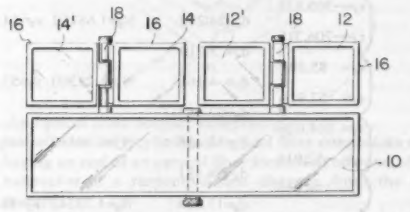


1. An optical line scanning system including in combination means for focusing an image of a line upon an arc of a circle, means providing at least one field stop, and means for causing the field stop means to traverse said circle, said focusing means having a focal length and having an optical center disposed in the plane of said circle, said traversing means including means mounting the field stop means for rotation about an axis which orthogonally intersects the plane at a point offset from said optical center in a direction such that the distance of the field stop means from the focusing means when traversing the image arc exceeds said focal length.

4,019,812
REARVIEW MIRROR ASSEMBLY WITH ROTATABLE MIRRORS

Elmo Carnine, 1260 NE. 115th St., Miami, Fla. 33161

Filed June 5, 1975, Ser. No. 584,220
Int. Cl.² G02B 5/08
U.S. Cl. 350—304 8 Claims

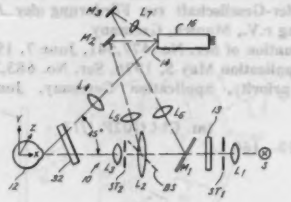


1. A rear view mirror assembly comprising an existing rear view vehicular mirror, an elongated base portion, connecting means for connecting said base portion to said existing mirror, at least a pair of rotational means, each adapted to longitudinally rotate on its own axis, each of said rotational means extending outwardly from the same side of said base portion in a direction upwardly from said existing mirror, each of said rotational means being transverse to said base portion, at least two mirror sections, each of said mirror sections rotatably engaged to one of said rotational means, said mirror sections being adjacent and extending between said pair of rotational means, said mirror sections being vertically disposed above said existing mirror.

4,019,813
OPTICAL APPARATUS FOR OBTAINING MEASUREMENTS OF PORTIONS OF THE EYE

Tom N. Cornsweet, and Richard A. Harrison, both of Houston, Tex., assignors to Baylor College of Medicine, Houston, Tex.

Filed Jan. 19, 1976, Ser. No. 650,391
Int. Cl.² A61B 3/10, 3/14
U.S. Cl. 351—14 22 Claims



1. An optical apparatus for obtaining one or more measurements of portions of an eye comprising,

means for providing a narrow beam of light through the center of curvature of the cornea of the eye including a light source, first lens means, and at least one narrow slit,

second lens means positioned in front of the eye but at an angle to the narrow beam of light for collecting light that is reflected from the eye,

a television camera positioned to receive the eye image collected by the second lens means, said television camera co-acting with means for obtaining the desired measurements of portions of the eye

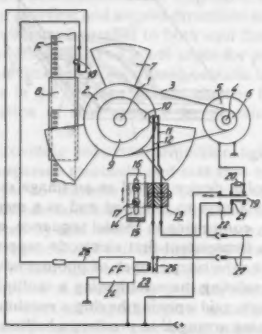
means for measuring when the narrow beam of light passes through the center of curvature of the cornea for indicating alignment of the eye with said television camera, and

means for focusing light on the eye and for focusing the reflected eye image on the television camera for measuring when the eye is correctly positioned along the optical axis of the apparatus for proper focus in the first and second lens means.

4,019,814
DEVICE FOR USE ON A FILM PROJECTOR FOR COPYING FILMS

Ludwig Blaschke, Munich, Germany, assignor to Braun Aktiengesellschaft, Kronberg, Taunus, Germany

Filed Nov. 5, 1973, Ser. No. 412,648
Claims priority, application Germany, Nov. 7, 1972, 2254445
Int. Cl.² G03B 21/38
U.S. Cl. 352—169 3 Claims



1. A device for use in cooperation with a film projector for photographing a film projection with a movie camera equipped with a single-frame releaser operable from a signal, said device comprising

a speed-changing means operable for changing the speed of projection of said film projector to less than 8 framer per second,

a pulse-generating means operable for producing a pulse signal synchronously with the film feed of said film projector,

coupling means for coupling said pulse signal to said movie camera to cause release of a single-frame exposure thereof, and

phase variable means for adjusting the phase relationship of operation of said pulse-generating means with respect to the film feed of said film projector, whereby synchronization between said pulse-generating means and the film feed, can be optimized.

4,019,815

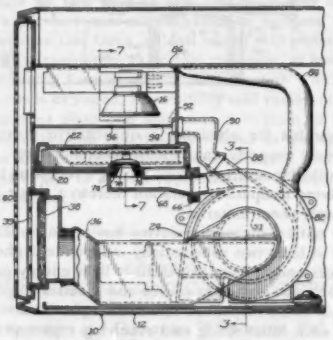
FILM HANDLING APPARATUS BLOWER SYSTEM

Frank L. Weninger, Chicago; John P. Bagby, Lake Forest; Kenyon A. Hapke, Libertyville; Jack W. Hinshaw, Northbrook; George C. Karalus, Arlington Heights; Eugene F. Koppensteiner, Niles, and Roger R. Tomlinson, Wheeling, all of Ill., assignors to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 374,285, June 28, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,112

Int. Cl.² G03B *21/16*

U.S. Cl. 353—61 **2 Claims**



1. In a film-handling apparatus having a projection lamp, a drive motor, and a cassette well adapted to receive a film cassette having an air intake port, a blower system comprising:

a blower having a first blower section for developing a relatively high-pressure, low-volume output and a second blower section for developing a relatively low-pressure, high-volume output, said first blower section including means defining a volute blower chamber having a volute integrity maintained through a geometric angular excursion of more than one revolution, an axial intake port and a tangential outlet port, and a circular impeller of cellular material rotatably driven in said volute chamber, said second blower section including means defining a second volute blower chamber having an axial intake port, a tangential outlet, and a cylindrically bladed fan-wheel rotatably driven in said second volute chamber, and said circular impeller of said first blower section and said circular impeller of said second blower section being secured to a common drive shaft rotatably driven by said drive motor;

means for directing output air flow from said first blower section to said cassette air intake port for flow into the interior of said cassette, said means for directing output air flow to said cassette air intake port including a laterally movable air-directing element resiliently biased into the region in which said cassette is received by said film-handling apparatus, said air-directing element being positioned and configured to include a cam surface arranged such that said element is laterally displaced by said cassette upon insertion of said cassette into said receiving region and caused to bear against the cassette to direct said air flow into said cassette air intake port;

means for directing output air flow from said second blower section into proximity with said projection lamp for cooling said projection lamp;

heat baffle means interposed between said projection lamp and said cassette well for minimizing the quantity of projection lamp radiant heat incident on said cassette well, said heat baffle having an aperture therein for passage of the projection lamp light beam;

means for directing additional output air flow from said second blower section into proximity with said heat baffle means; and

means for directing additional output air flow from said second blower section into proximity with said drive motor for cooling said drive motor.

4,019,816

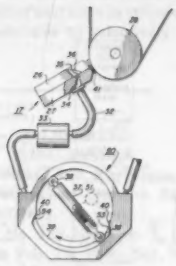
COATING SYSTEM HAVING A COMPOSITE APPLICATOR ASSEMBLY PROVIDED WITH A RECIPROCATING BLADE

John S. Bernhard, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 16, 1975, Ser. No. 578,296

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 P **11 Claims**



1. A coating apparatus comprising:

a composite blade assembly having a coater blade base, an applicator plate supported on the top surface of said base, means for supplying a coating fluid to the top surface of said base, means for reciprocating said applicator plate forward and backward and means for coordinating the reciprocation of the applicator plate with the supply of coating fluid to the top surface of the coater blade base.

4,019,817

METHOD OF COLOR IMAGE RECORDING

Kazuya Matsumoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 400,554, Sept. 25, 1973, abandoned. This application May 7, 1975, Ser. No. 575,245

Claims priority, application Japan, Sept. 28, 1972, 47-97797

Int. Cl.² G03B *27/08*

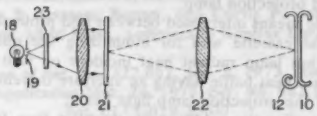
U.S. Cl. 355—132 **8 Claims**

1. A method of recording an object recorded on a color positive film onto a monochrome recording medium as diffraction grating images in respective color components, comprising:

contacting the color positive film with the monochrome recording medium;

projecting onto said color positive film, through a plurality of diffraction gratings, a plurality of superimposed component color images correspondng to different diffraction

grating images, each corresponding to a color of said object recorded on said color positive film, without changing the relative position between said monochrome recording medium and said color positive film at the time of the projection, and



passing each of said diffraction grating images through its respective color component portion of said color positive film, and forming diffraction grating images corresponding to said color components on said monochromatic recording medium.

4,019,818

INTERFEROMETRIC TECHNIQUE FOR DETERMINING ULTRASONIC WAVE INTENSITY

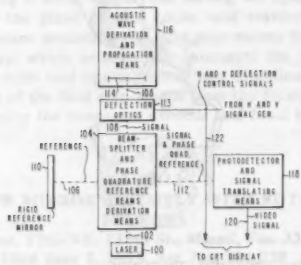
David Herman Raphael Vilkomerson, South Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 8, 1976, Ser. No. 675,222

Claims priority, application United Kingdom, Mar. 4, 1976, 08665/76

Int. Cl.² G01N *21/46*

U.S. Cl. 356—106 R **10 Claims**



1. In a system responsive to the intensity of radiated ultrasonic wave energy having a given frequency; the combination comprising:

a. first means including photodetector and signal translating means, responsive to the simultaneous illumination thereof with respective first and second beams of coherent light of a predetermined wavelength each of which has an intensity component at said given frequency, for deriving an output signal having a magnitude in accordance with the sum of the squares of the respective intensity components at said given frequency of each of said first and second beams, and

b. second means comprising an interferometer for simultaneously illuminating said photodetector and signal translating means with said first and second beams, said interferometer including a substantially rigid reference mirror, a displaceable signal mirror adapted to be insonified by said ultrasonic wave energy, and beam splitter and phase quadrature reference beam derivation means illuminated by said coherent light, said beam splitter and phase quadrature beam derivation means being cooperatively located with respect to said reference mirror and said signal mirror to derive as said first beam the interference between signal light reflected from an insonified spot of said signal mirror and first reference light reflected from said reference mirror that has a first temporal reference phase and to derive as said second beam the interference between said signal light and second reference light reflected from said reference mirror that has a second temporal reference phase substantially in quadrature with said first temporal reference phase.

4,019,819

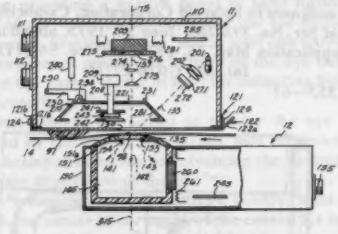
OPTICAL PROPERTY MEASUREMENT AND CONTROL SYSTEM

Fred P. Lodzinski, Port Edwards, Wis., assignor to Nekoosa Papers Inc., Port Edwards, Wis.

Continuation-in-part of Ser. No. 429,637, Dec. 28, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,251

Int. Cl.² G01N *21/00; 1/28;* G01N *21/16*

U.S. Cl. 356—73 **45 Claims**



1. Apparatus for obtaining a quantitative measure of a paper optical property, said apparatus comprising:

a. an optical measuring device having a receiving region for receiving in operative relation thereto a single thickness of paper sheet material,

b. said optical measuring device having an optical system with at least two substantially independent photometric sensors and at least two distinct light energy paths each including at least light source and spectral response filter means and a respective one of said photometric sensors, and each intersecting said receiving region prior to the respective associated photometric sensor,

c. each of said at least two distinct light energy paths having substantially a common spectral response characteristic sufficient to characterize said paper optical property but being respectively arranged for collecting reflected and transmitted light energy from the receiving region after impingement of the light energy on a single thickness of paper sheet material at said region so as to essentially characterize the reflectance and transmittance of the paper sheet material, whereby the paper optical property is characterized with substantially greater accuracy than any characterization of said paper optical property by either a reflectance or a transmittance measurement taken by itself, and

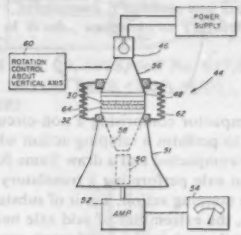
d. automatic digital computer means connected on line with said optical measuring device and coupled with the respective photometric sensors of said distinct light energy paths for receiving therefrom respective output signals in accordance with the reflectance and transmittance of the paper sheet material and automatically operable on the basis of said output signals to calculate a quantitative indication of said paper optical property,

e. said optical system having two distinct light energy paths each having a spectral response characteristic substantially corresponding to the standard brightness spectral distribution of light energy, and said quantitative indication representing the standard brightness of said paper sheet material.

4,019,820
MUCUS SAMPLING AND MEASURING SYSTEMS, DEVICES AND PROCESSES

Louis Kopito, Brookline, and Samuel R. Schuster, Wellesley, both of Mass., assignors to Ovutime, Inc., Wellesley, Mass.

Continuation-in-part of Ser. No. 399,145, Sept. 20, 1973, Pat. No. 3,891,325. This application May 1, 1975, Ser. No. 573,730
The portion of the term of this patent subsequent to June 24, 1992, has been disclaimed.
Int. Cl.² G01N 21/24
U.S. Cl. 356—205 14 Claims

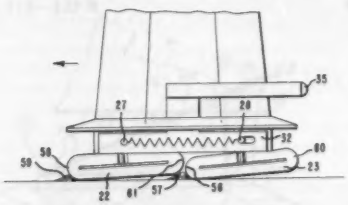


1. A process for determining the phase of a menstrual cycle, said process comprising the steps of contacting a face of a first plate with a sample of bodily mucus, superposing a face of a second plate on said face of said first plate and uniformly applying a pressure across said plates to produce a mucus stratum between said faces, at least one of said plates being at least partially transparent to certain radiation, at least one of said plates being formed with a port through which excess bodily mucus is extruded, transmitting said radiation through said transparent plate and said mucus stratum in order to produce an indication functionally related to absorptivity of said mucus stratum with respect to said radiation, and processing said indication to a form representative of said phase of said menstrual cycle.

4,019,821
APPARATUS FOR TONING TACKY SURFACES

Helmut Gustav Sandner, Oceanport, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 605,541, Aug. 18, 1975. This application July 30, 1976, Ser. No. 710,102
Int. Cl.² B05C 11/02
U.S. Cl. 401—4 6 Claims

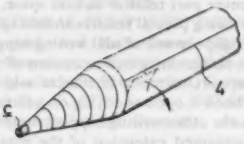


1. A toner applicator apparatus comprising a housing for containment of toner, at least one free moving weight within said housing for breaking up toner aggregates and agitating the toner, a pair of separable applicator pad members forming the bottom wall of said housing, means to impart-translation to said members to open and close said housing thereby releasing said toner onto a substrate to be developed, said pads being hingedly mounted to facillitate application of a mound of said released toner to the image areas of said substrate upon functional movement of said apparatus over said substrate, and at least two hinged pads mounted on the housing.

4,019,822
PENCILS NOT REQUIRING SHARPENING

Takeshi Matsumoto; Hidehiko Kaji, both of Sodegaura; Osamu Isogai, Ichihara, and Masami Tomikawa, Sodegaura, all of Japan, assignors to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.), Tokyo, Japan

Filed Sept. 2, 1975, Ser. No. 609,517
Claims priority, application Japan, Sept. 6, 1974, 49-107698
Int. Cl.² B43K 19/14
U.S. Cl. 401—96 8 Claims

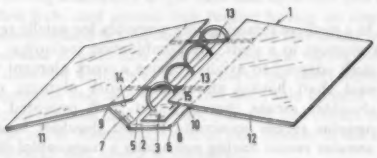


1. Pencil not requiring sharpening, comprising:
a core material; and
an unperforated uniaxially stretched thermoplastic resin sheet, having a plurality of spaced lines of molecules oriented generally in the stretched direction, wrapped around said core material so that a stretched direction of the sheet, and said lines of molecules, form a spiral along the length of said core material and that the sheet forms a smooth outer-surfaced holder, the sheet being selectively tearable off of said core in strips substantially along said lines of molecules to selectively expose said core material.

4,019,823
RING BINDER

Heinz Kleinert, Lubbecke, and Karl-Heinz Schudy, Espelkamp, both of Germany, assignors to Robert Krause KG Hindenburgring, Germany

Continuation of Ser. No. 529,206, Dec. 3, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 661,923
Claims priority, application Germany, Dec. 6, 1973, 2360721
Int. Cl.² B42F 13/00
U.S. Cl. 402—75 2 Claims



1. A ring book comprising a spine, a ring binding mechanism having rings for holding punched stationery sheets secured to said spine, intermediate cover parts hinged to said spine at a first hinge axis, cover members hinged to said intermediate cover parts at a second hinge axis, said spine, said intermediate cover parts, and said cover members being formed in one piece and comprising outer plies integral with one another, a writing support member secured to each of said cover members and projecting from said respective cover member beyond said second hinge axis toward said ring binding mechanism, said writing support members comprising inner plies of said cover members presenting a support surface forming a coextensive extension of said cover members, flexible connecting webs of invariable length extending between said intermediate cover parts and secured to said intermediate cover parts adjacent said second hinge axes, said webs having

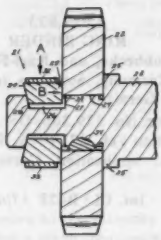
a length greater than the width of said spine such that said intermediate cover parts are disposed at an obtuse angle relative to said spine when the ring book is open and said webs are taut, said writing support members having a width such that when the book is in said open position the inner terminating edges of said writing support members fall without an imaginary cylinder defined by said rings whereby said cover members and coextensive writing support members are freely movable independently of said rings, said spine and intermediate cover parts being pivotally connected at said first and second hinges such that angular displacement of one of said intermediate cover parts relative to said spine effects a corresponding but opposite angular displacement of said other intermediate cover part relative to said spine, said intermediate cover parts being pivotal relative to said spine to an operative position to dispose one of said writing support members in a position such that an imagined extension of the plane of said one writing support member intersects said rings chordally when the ring book is open and lying on a flat surface member and to dispose the other writing support member in a position such that an imagined extension of the plane of said other writing support member is approximately tangential to said rings when the ring book is open to thereby preclude interference by the rings as handwriting is manually effected on the edge portion of a punched stationery sheet disposed on said other writing support member.

4,019,824

POSITIVE RING RETAINING SYSTEM

Vernon L. Percy, P. O. Box 684, Wedderburn, Oreg. 97491

Filed Feb. 3, 1976, Ser. No. 654,929
Int. Cl.² F16B *21/00*
U.S. Cl. 403—261 **10 Claims**



1. In a positive retaining ring assembly for axially securing a work element to a shaft, the combination including:

a shaft adapted to axially receive a work element thereon, said shaft having an annular work element retaining shoulder means thereon, said shaft provided with an annular recess proximate to said shoulder means, said annular recess having essentially a trapezoidal dross-sectional configuration open on a parallel side;

a segmented ring having a trapezoidal cross-sectional configuration with an outer circumferential surface normal to the axis of said ring, said ring adapted to matingly engage said annular recess and the side of a work element mounted on the shaft intermediate said recess and said shoulder means; and

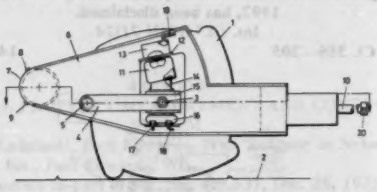
clamping means provided in operative engagement with the outer circumferential surface of said segmented ring, said clamping means adapted to move radially inwardly against said segmented ring so as to selectively exert a direct inward radial force upon said segmented ring normal to the outer circumferential surface thereof and wedge said ring radially into said recess whereby said ring exerts a resultant axial retentive force against the side of the work member to lockably retain said work member against said shoulder means.

4,019,825

SOIL COMPACTOR

Aubrey Ralph Berrangé, 147 Marais St., Brooklyn, Pretoria, Transvaal, South Africa

Filed Nov. 21, 1975, Ser. No. 634,321
Int. Cl.² E01C *19/34*
U.S. Cl. 404—133 **1 Claim**



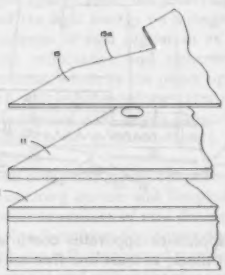
1. A soil compactor comprising a non-circular compacting roller adapted to perform a tamping action when moved over a surface to be compacted and a draw frame for the roller, the roller having an axle performing a translatory oscillating motion during the tamping action, a pair of substantially horizontal crank arms, the extremities of said axle being mounted on the draw frame through said pair of crank arms, by the corresponding ends of said crank arms, said extremities of the axle being journalled and the other corresponding ends of said crank arms being journalled to said frame, a pneumatic suspension system with upper and lower air cushions between the ends of the crank arms to which the roller axle is journalled and said frame, the upper air cushions comprising an air spring and being attached to said ends of said crank arms, the lower air cushions being free of said ends and comprising a buffer against excessive motion of the roller axle relative to said frame, said upper air cushions having air back-up volume means to counteract variation of the spring force with compression of the upper air cushions, the upper and lower air cushions being respectively located substantially above and below said roller axle.

4,019,826

METHOD FOR DRILLING CIRCUIT BOARDS

James P. Block, Long Beach, Calif., assignor to LCOA Laminating Company of America, Cerritos, Calif.

Filed June 18, 1973, Ser. No. 371,303
The portion of the term of this patent subsequent to Oct. 24, 1989, has been disclaimed.
Int. Cl.² B23B *35/00*
U.S. Cl. 408—1 R **5 Claims**



1. A technique for drilling holes in a circuit board comprising the steps of:

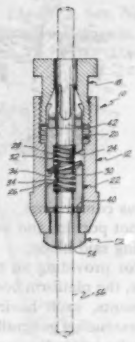
placing the circuit board on a back-up board with one of the broad surfaces of the circuit board resting against a broad surface of the back-up board wherein said back-up board is formed of a pressed wood fibrous core having metal foil laminated to both sides thereof;

placing a metal foil over the other surface of the circuit board;
placing retaining means on said foil and circuit board to temporarily retain the foil on the board;
drilling through the foil and the circuit board to the back-up board; and
after the drilling has been completed, removing the metal foil from the circuit board surface.

4,019,827
DRILL STOP

Merrill Andrew Christianson, Puyallup, and Horace Earl Hill, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sept. 29, 1975, Ser. No. 617,620
Int. Cl.² B23B 47/00, 49/00
U.S. Cl. 408—202 **17 Claims**

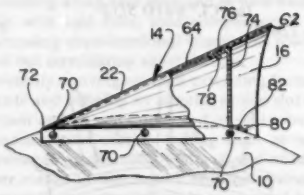


1. A drill stop comprising: a washer located inside a housing to encircle a drill extending along a longitudinal axis, means for forcing the washer between sleeves having facing inclined surfaces into an inclined position with respect to said longitudinal axis for locking to the drill, and resilient means for releasing the washer from the drill when the means for forcing the washer is removed.

4,019,828
WIND DRIVEN APPARATUS

George J. Bunzer, 54 Crown Point, Nokomis, Fla. 33555

Filed Nov. 1, 1974, Ser. No. 519,805
Int. Cl.² F03D 7/06, 3/04
U.S. Cl. 415—122 R **9 Claims**

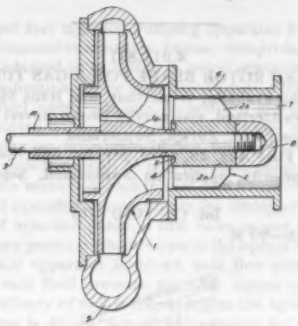


1. Wind driven apparatus comprising, a base, means mounting said base for rotation about an axis, means responsive to the flow of wind past the base for rotating the base about said axis, said means including a plurality of wind receiving members operatively associated with the base and each having a mouth for receiving the wind passing the apparatus and responsive thereto rotating the base about said axis, and each member having a closed end opposite said mouth and converging from said mouth toward said end for deflecting the wind about the member, each member further including means spaced slightly inwardly of the outer periphery of the mouth and defining an inner portion of the mouth and substantially preventing passage of wind from said mouth into said end portion, said members being mounted on said base in a spaced apart series about said axis with the mouth of each member spaced from the end of the adjacent member and facing in a generally contrarotational direction of said base with the mouth substantially unobstructed by the adjacent end as the mouth moves into the path of the wind, and the converging ends directed in the rotational direction of said base.

4,019,829
CENTRIFUGAL PUMP WITH INDUCER

Hans-Dieter Knopfel, and Heinz-Bernd Matthias, both of Frankenthal, Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Germany

Filed Aug. 8, 1975, Ser. No. 603,087
Claims priority, application Germany, Aug. 22, 1974, 2440230
Int. Cl.² F04D 1/00
U.S. Cl. 415—143 **8 Claims**



1. In a centrifugal pump, a combination comprising a casing having an intake; a centrifugal impeller rotatably mounted in said casing and having a first hub provided with an upstream end face; and a rotary inducer coaxial with said impeller and disposed in said casing intermediate said intake and said impeller, said inducer including a second hub having a downstream end face abutting said upstream end face of said first hub and having a diameter larger than said upstream end face of said first hub, said second hub further having an annular fluid recess provided in said downstream end face in the outer portion of said downstream end face, and said recess having an inner diameter which is at least equal to the outer diameter of said upstream end face of said first hub, said annular fluid recess facing towards said first hub, whereby turbulence tending to form at the downstream end of said inducer in the fluid flowing through said casing is alleviated.

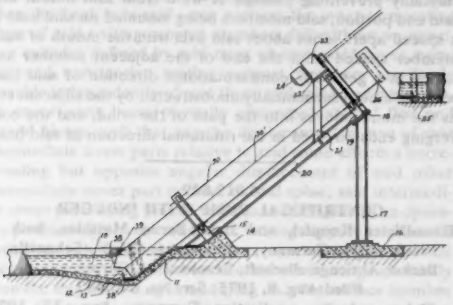
4,019,830
CONE PUMP

Robert A. Reid, Charlton City, Mass., assignor to CPC Engineering Corporation, Sturbridge, Mass.

Filed Oct. 6, 1975, Ser. No. 619,569
Int. Cl.² F04D 3/00
U.S. Cl. 415—72 **4 Claims**

1. A conveyor for liquids comprising
a cylindrical tube formed around a longitudinal axis and
a conveyor screw having a plurality of flights within the tube, each flight having a generally helical form and mounted around a central longitudinal axle,
the pitch of said screw being such that the individual flights are pitched at an angle of 20° to 45° downward in rotation to the central axis of the said cylinder tube.

said conveyor screw having the outer edge of the helical flights integrally joined to the tube and having inner free edges adjacent the axis of said cylindrical tube,



the inner edge of said helical flights being upwardly directed and from said corresponding outer edge,

means for supporting the tube at the two ends thereof, and

means for rotating the tube.

4,019,831

COOLED ROTOR BLADE FOR A GAS TURBINE

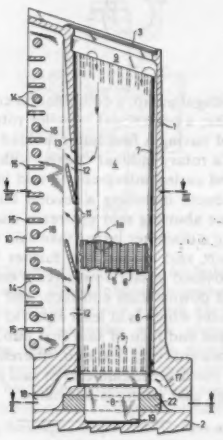
Clifford John Franklin, Winterthur, and Hans Melliger, Wil, both of Switzerland, assignors to Brown Boveri Sulzer Turbomachinery Ltd., Zurich, Switzerland

Filed Aug. 28, 1975, Ser. No. 608,754

Claims priority, application Switzerland, Sept. 5, 1974, 12079/74

Int. Cl.² F01D *5/18*

U.S. Cl. 416—97 R **11 Claims**



1. A cooled rotor blade for a gas turbine comprising

a hollow jacket having a perforated partition therein defining a hollow chamber on one side of said partition and having a leading edge, a trailing edge, a blade root and a blade tip;

a plurality of ribs on said jacket within said hollow chamber and extending from said blade root to said blade tip;

at least one insert disposed within said hollow chamber against said ribs to define flow passages therebetween;

a first cooling-air chamber in said blade root in communication with said flow passages;

a second cooling air chamber in said blade tip in communication with said flow passages and with the interior of said insert; and

a plurality of air outlets extending over said blade trailing edge and being in communication with said insert interior through orifices in said insert and said perforated partition whereby cooling air passing into said first cooling-air chamber flows through said flow passages, said second cooling-air chamber, said insert interior, said partition and said outlets in said trailing edge.

4,019,832

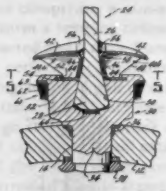
PLATFORM FOR A TURBOMACHINERY BLADE

Charles T. Salemme; Richard Ravenhall, both of Cincinnati, and David J. Harris, Fairfield, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Feb. 27, 1976, Ser. No. 661,968

Int. Cl.² B64C *11/06*; F01D *7/00*

U.S. Cl. 416—135 **10 Claims**



2. A rotor apparatus comprising:

a blade having a root portion and an airfoil portion;

means for supporting said blade;

a blade platform for providing an aerodynamic flow path around the blade, the platform comprising a pair of complementary elements, each having an outer flow path defining shroud extending generally laterally of the blade, an inner flange also extending generally laterally of the blade and into a cooperating locking groove formed within the blade supporting means to limit outward displacement of the platform, and a contoured member extending between the shroud and the flange having a surface generally conforming to an overlapping wedge retaining means disposed upon the blade airfoil portion for further limiting outward displacement of the platform.

4,019,833

MEANS FOR RETAINING BLADES TO A DISC OR LIKE STRUCTURE

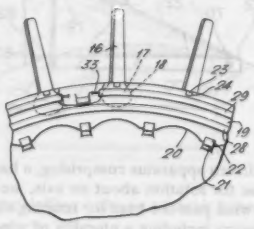
Anthony George Gale, Wollaton, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Oct. 31, 1975, Ser. No. 627,785

Claims priority, application United Kingdom, Nov. 6, 1974, 47904/74

Int. Cl.² F01D *5/32*

U.S. Cl. 416—220 R **7 Claims**



1. A rotor assembly comprising: a plurality of blades, a rotor disc having means for supporting said plurality of blades thereon against radial movement therefrom, a ring carried on said disc and engaging said blades to restrain their axial move-

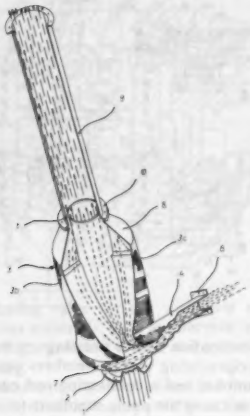
ment in one direction, a bayonet type of connection between said ring and said disc for holding said ring to said disc, and means providing engagement of at least some of said blades with said ring upon assembly of said blades on said disc to prevent said ring from rotating with respect to said disc and consequent disconnection of said ring from said disc.

4,019,834

GAS EXTRACTION APPARATUS FOR THERMAL INSTALLATIONS

Constantin Teodorescu, Bucharest, Romania, assignor to Institutul National Pentru Creatie Stintifica si Technica, Bucharest, Romania

Filed May 23, 1975, Ser. No. 580,329
Claims priority, application Romania, May 23, 1974, 78906
Int. Cl.² F04F *5/20*
U.S. Cl. 417—84 **1 Claim**



1. An apparatus for treating a hot gas, said apparatus comprising:

an elongated constant-cross section tube having an inlet end for receiving said hot gas and an outlet end downstream therefrom;

a jacket extending axially along said tube forming at a plurality of elongated compartments arranged around and extending along said tube and in heat-exchange relationship with said tube, said compartments each being of increasing cross-sectional dimension toward said outlet end but terminating short thereof;

an inwardly converging shell extending from said compartments and defining an annular nozzle slot opening downstream and at said outlet end of said tube;

a constant-cross section mixing duct at said outlet end surrounding said outlet end and said nozzle;

blower means for forcing air into the upstream end of said compartment, whereby said air is heated in said compartment and issues under pressure from said nozzle slot to suck said hot gas from said tube;

an annular inlet manifold communicating with the upstream ends of said compartments adjacent said inlet end of said tube and extending only over a part of the length of said tube at the inlet end thereof; and

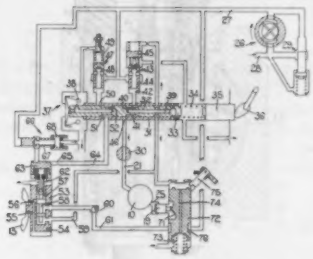
a tangential conduit opening into said manifold and connecting said manifold with said blower means, said jacket and said shell extending substantially over the entire length of said duct.

4,019,835

LIQUID FUEL INJECTION PUMPING APPARATUS

Robert Thomas John Skinner, High Wycombe, England, assignor to C.A.V. Limited, Birmingham, England

Filed July 17, 1975, Ser. No. 596,894
Claims priority, application United Kingdom, July 19, 1974, 32018/74
Int. Cl.² F04B *3/00*
U.S. Cl. 417—253 **15 Claims**



1. A liquid fuel injection pumping apparatus for supplying fuel to an internal combustion engine, comprising: an injection pump adapted to be driven in timed relationship with an internal combustion engine and having a cam, a feed pump for supplying fuel under pressure, a body, a movable throttle member located within said body, said throttle member and body defining an adjustable orifice through which fuel is adapted to flow for supply to said injection pump, fluid pressure operable means coupled to said cam whereby movement of said fluid operable means adjusts the timing of delivery of fuel by said injection pump; a first valve means operable to provide a first pressure which varies as the square of the speed at which said apparatus is driven, said first pressure being applied to said fluid pressure operable means whereby the timing of delivery of fuel is responsive to the speed at which the apparatus is driven, second valve means for providing a second pressure which varies in accordance with the law RN^2 where R is a constant and N the speed at which the apparatus is driven, fuel at said second pressure being supplied to the injection pump through said adjustable orifice, a third valve for providing a third pressure having a substantially constant value, and a further adjustable orifice defined by said throttle member and body for deriving control pressure from said third pressure, a piston adapted to be subjected to said control pressure, and resilient means, said piston acting to control the force exerted on said fluid pressure operable means by said resilient means acting in opposition to said first pressure.

4,019,836

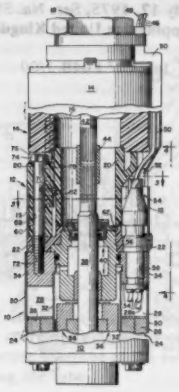
PLASTIC MOTOR-PUMP BASE FOR A SUBMERSIBLE PUMP UNIT

Elmer M. Deters, Muscatine, Iowa, assignor to Weil-McLain Co., Inc., Dallas, Tex.

Continuation of Ser. No. 520,650, Nov. 4, 1974, abandoned. This application Apr. 20, 1976, Ser. No. 678,534
Int. Cl.² F04B *17/00, 39/12, 47/06*
U.S. Cl. 417—360 **11 Claims**

1. A submersible deep-well pump unit of the type comprising a motor and a pump interconnected by a suction manifold base through which a driving connection between the motor and pump is made, wherein the improvement comprises said

base being made of plastic, and fastening means connecting said base to the pump and the motor of placing said base



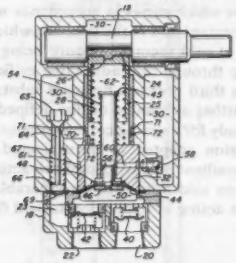
under axial compression over its length to increase its strength.

4,019,837

PRESSURE UNLOADING APPARATUS FOR A DIAPHRAGM PUMP

Marvin J. Eull, St. Michael, Minn., assignor to Graco Inc., Minneapolis, Minn.

Filed May 30, 1975, Ser. No. 582,262
Int. Cl.² F04B *9/08, 35/02*
U.S. Cl. 417—386 **2 Claims**



1. A diaphragm pump apparatus of the type having a mechanically reciprocated piston driving a pumping diaphragm through an intermediary hydraulic fluid displacement chamber to cause the pumping diaphragm to deflect to pump liquid through an inlet and outlet check valve to an output, comprising:

a. a hydraulic fluid reservoir in said apparatus for storing a supply of hydraulic fluid;

b. a fluid chamber having a passage to said hydraulic fluid reservoir and having a connecting port to said displacement chamber;

c. a valve in said passage between said fluid chamber and said hydraulic fluid reservoir, having a valve surface exposed to said displacement chamber pressure to develop valve opening forcing thereon

d. a passage between said fluid chamber and said output and a control diaphragm interposed across said passage in fluid sealing relationship;

e. a slidable plunger adjacent, but not connected to, said control diaphragm, and spring biasing means for urging said plunger toward said control diaphragm;

f. a rod connected between said plunger and said valve for translating control diaphragm deflection to valve opening and closing motion;

g. a valve passage between said displacement chamber and said reservoir, said valve passage having therein a check valve openable by an excess differential pressure in said reservoir relative to displacement chamber; and

h. a slide valve connected to said pumping diaphragm and slidable over said valve passage to open said valve passage during a maximum deflection of said pumping diaphragm

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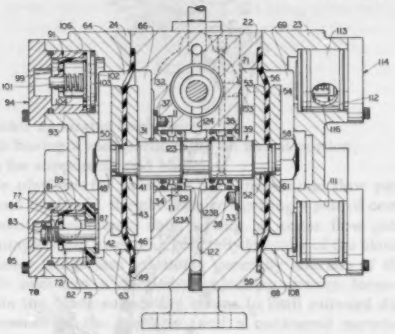
4,019,838

AIR PRESSURE-ACTUATED DOUBLE-ACTING DIAPHRAGM PUMP WITH MEANS TO PRODUCE A SELECTED START-UP POSITION

Henry T. Fluck, 7735 Jolain Drive, Cincinnati, Ohio 45242

Filed Sept. 3, 1975, Ser. No. 609,954
Int. Cl.² F04B *17/00, 35/00;* **F01L** *25/02;* **F15B** *13/16*
U.S. Cl. 417—393 **3 Claims**



1. In combination with a two-stage pump which includes a pair of reciprocating pump members operating in opposed pump chambers and a connecting rod connecting the pump members to cause the pump members to operate in unison, a control valve for supplying air under pressure to said pump chambers which comprises a spool valve member, a guide sleeve guiding said spool valve member for reciprocation, said spool valve member including an inner pair of outwardly extending portions defining a central pressure slot and an outer pair of outwardly extending portions, each of the outer pair defining an exhaust slot with one of the inner pair, means in the sleeve for connecting the central pressure slot with a source of air under pressure, means in the sleeve for releasing pressure in each of the exhaust slots, a first port in the sleeve communicating with a first one of the chambers, a second port in the sleeve communicating with the other of the chambers, the spool valve member moving between a first limit position in which the first port is in communication with the pressure slot and the second port is in communication with one of the exhaust slots to cause movement of the connecting rod and the pump members in one direction and a second limit position in which the second port is in communication with the pressure slot and the first port is in communication with the other of the exhaust slots to cause movement of the connecting rod and the pump members in an opposite direction, there being pressure chambers at opposite ends of the sleeve member, means controlled by the connecting rod for supplying air under pressure to one of said pressure chambers when the connecting rod is in one position to cause movement of the spool valve member toward the other of said pressure chambers, means controlled by the connecting rod for supplying air under pressure to the other pressure chamber to cause movement of the spool valve member toward the first pressure

chamber when the connecting rod is in a second position, and means releasably engageable with the spool valve member for advancing the spool valve member to one of the limit positions to position the spool valve member for starting the pump, there being metering air passageways exhausting air from the pressure chambers.

4,019,839

DISTRIBUTING VALVES FOR VISCOUS MATERIALS

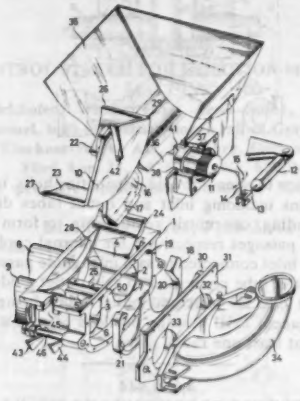
Friedrich Schwing, Wanne-Eickel, Germany, assignor to Friedrich Wilhelm Schwing GmbH, Wanne-Eickel, Germany

Filed Mar. 27, 1975, Ser. No. 562,580

Claims priority, application Germany, Mar. 29, 1974, 2415276

Int. Cl.² F04B *15/02, 39/10*

U.S. Cl. 417—517 **14 Claims**



1. A distributing valve for use with twin cylinder pumps supplying viscous materials, such as concrete, each cylinder of said pump having a pressure orifice and a suction orifice, said valve comprising:

a casing connectable to the pump and having a portion which is subjected at least partially to the pressure to the pump;

a shaft journalled in said casing outside the portion subjected to the pump pressure for movement about an axis generally parallel to the cylinders; and

an oscillating body coupled to, and adapted to be driven by, said shaft, said oscillating body having closing elements which alternately open the suction orifice of one of the pump cylinders and the pressure orifice of the other of the pump cylinders responsive to oscillatory movement of said body, said closing elements being arranged on the same side of the rotating shaft and including a pair of closing elements for either the suction orifices of the pressure orifices.

4,019,840

POSITIVE DISPLACEMENT VANE TYPE ROTARY PUMP

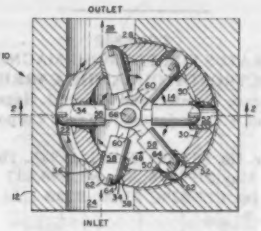
Charles A. Christy, 201 Airport Drive, Farmington, N. Mex. 87401

Filed Apr. 2, 1975, Ser. No. 564,289

Int. Cl.² F03C *3/00*

U.S. Cl. 418—241 **15 Claims**

1. A vane rotary device comprising a housing member having a cavity extending therethrough, first and second end closure members, a rotor disposed in said cavity and rotatably supported in said housing member, said rotor having a plurality of radial openings therein, vane means disposed in each of said radial openings for sliding movement therein and rotary movement along with said rotor, an inlet passage and an outlet passage on spaced apart portions of said housing member communicating with said cavity, said cavity including a generally cylindrical circumferential portion and a channel offset radially beyond said generally cylindrical portion and extending from said inlet passage to said outlet passage, said channel in operation of said pump serving as a fluid pumping chamber, said vane means being supported on a fixed journal element concentric with said channel for pivotal movement thereabout and extending radially outwardly of said rotor and in pressure



sealing relationship with said channel while being rotated through said channel by said rotor thereby pumping fluid from said inlet passage to said outlet passage, said cylindrical portion extending between said outlet passage and said inlet passage, said vane means being retracted within said rotor as said rotor passes said cylindrical portion and a circumferential groove extending in said cylindrical portion providing communication between radial openings simultaneously passing said cylindrical portion to relieve pressure therein and thereby to facilitate radial movement of said vane means.

4,019,841

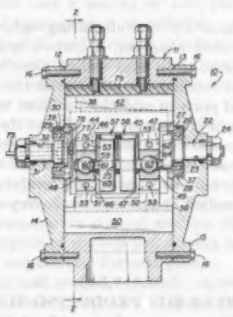
YOKE MECHANISM FOR FLUID DISPLACEMENT DEVICE

Arthur Kamin, 303 W. Hawley, Mundelein, Ill. 60060, and Clifford A. Evans, Rte. No. 3 Box 85, Waukegan, Ill. 60085

Continuation-in-part of Ser. No. 437,361, Jan. 28, 1974, abandoned. This application July 17, 1975, Ser. No. 596,857

Int. Cl.² F04C *1/00*

U.S. Cl. 418—257 **6 Claims**



1. A positive displacement fluid device, comprising

a fluid chamber,

a rotor journaled for rotation in said chamber,

said rotor being provided with a plurality of sets of diametrically opposed slots,

a shaft offset from the axis of rotation of said rotor,

a plurality of slide members each having a transverse opening therein rotatably receiving said shaft,

a plurality of yoke members each having a bore therein slidably receiving a respective one of said slide members,

a first pair of vanes disposed in one of said sets of slots with

each of said vanes being connected by freely pivotably connections to each of a pair of said yoke members to form a parallelogram, and

a second pair of vanes disposed in another of said sets of slots with each of said second pair of vanes being connected by freely pivotable connections to each of another pair of said yoke members to form a parallelogram,

whereby said pairs of vanes are movable in the planes of the respectively associated slots to provide limited self-adjustment of said vanes in said chamber.

4,019,842

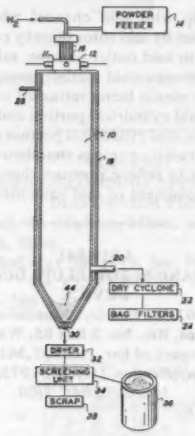
APPARATUS FOR FORMING MAGNETITE ELECTROSTATOGRAPHIC CARRIERS

Rudolph Forgensi, Webster, and Robert J. Hagenbach, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 552,589, Feb. 24, 1975. This application May 27, 1976, Ser. No. 690,687

Int. Cl.² B29C *23/00;* **B28B** *1/54*

U.S. Cl. 425—7 **11 Claims**



1. An apparatus for manufacturing spheroidized beads comprising a walled chamber, a carbon arc plasma flame assembly positioned atop said walled chamber, a vibrating feeder means for feeding ore particles in the presence of an inert gas via feed ports to said plasma flame assembly, means for feeding at least one gas to said plasma flame assembly, a purge system connected to the upper portion of said walled chamber, an exhaust system leading from the lower portion of said walled chamber, and an output conduit located at the bottom of said walled chamber for recovery of said spheroidized beads.

4,019,843

FILM BLOWHEAD FOR PRODUCING TUBULAR FILM

Werner Josef Zimmermann, Lengerich of Westphalia, Germany, assignor to Windmoller & Holscher, Lengerich of Westphalia, Germany

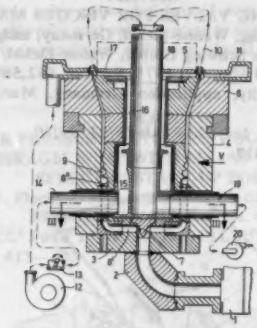
Filed Sept. 23, 1975, Ser. No. 616,069

Claims priority, application Germany, Sept. 24, 1974, 2445545

Int. Cl.² B29D *23/04*

U.S. Cl. 425—72 R **4 Claims**

1. A film blowhead for producing tubular film from thermoplastic material comprising, in combination, a blowhead housing, a blowhead insert in said housing provided with a distributing helix defining with said housing an overflow gap that continuously increases in size, a central melt supply conduit, a plurality of distributing passages connected to said supply conduit extending radially outward from said supply conduit towards said blowhead housing and opening into said distributing helix, each of said distributing passages including a radial passage portion connected to said central melt supply conduit and extending in a common radial plane towards a marginal region of said blowhead insert and an axial passage portion extending upwardly at a right angle to said radial



passage portion to open into said distributing helix, internal air cooling means including inlet and outlet tubes disposed in axially extending, concentric relationship to form inlet and outlet guide passages respectively for internal cooling air, at least one air inlet connected to said inlet guide passage and at least one outlet tube connected to said outlet guide passage, said at least one air inlet and outlet tubes being disposed between adjacent axial passage portions of said distributing passages in at least one radial plane.

4,019,844

APPARATUS FOR PRODUCING MULTIPLE LAYERS CONJUGATE FIBERS

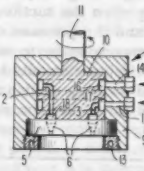
Masafumi Ogasawara; Masanori Akita, both of Otsu; Kazuhiko Saito, Kusatsu; Yoshikazu Kikuchi, and Mitsuhiro Shiokawa, both of Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Division of Ser. No. 443,506, Feb. 19, 1974, Pat. No. 3,924,045. This application July 2, 1975, Ser. No. 592,453

Claims priority, application Japan, Feb. 26, 1973, 48-22246; Mar. 31, 1973, 48-37155; Apr. 6, 1973, 48-38765

Int. Cl.² D01D *3/00, 5/28*

U.S. Cl. 425—131.5 **7 Claims**



1. An apparatus for producing a multiple layer conjugate fiber, comprising:

a. a housing having a spinning plate mounted thereon and a plurality of polymer feed inlets, said spinning plate having a plurality of orifices,

b. a cylinder plug having a plurality of polymer feed grooves and passages, mounted in said housing,

c. said passages being arranged so as to communicate with at least one of said grooves,

d. said grooves being arranged along the outer periphery of said cylinder plug and each groove being in communication with one of the polymer inlets in said housing,

e. said passages having outlets arranged along a circumference located at a position corresponding to the circumference of the spinning orifices arranged on the spinning plate, and an annular multi-laminar chamber formed between the spinning orifices and the outlet of said polymer passages, one of said spinning plate and said cylinder plug being stationary and the other being mounted for rotation.

4,019,845
CONTROL SYSTEM FOR INJECTION-MOLDING MACHINE

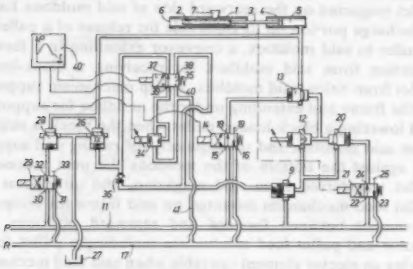
Hans Birkhofer, Windenreute; Arno Stöhr, and Werner Schrammel, both of Emmendingen, all of Germany, assignors to Klockner-Werke AG, Duisburg, Germany

Filed Apr. 21, 1976, Ser. No. 678,941

Claims priority, application Germany, May 27, 1975, 2523303

Int. Cl.² B29F *1/06*; F15B *21/02*

U.S. Cl. 425—146 **10 Claims**



1. In combination with an injection-molding machine having a drive ram with a pressurizable chamber and with a source of fluid under pressure having a high-pressure side and a low-pressure side, a control system comprising: a pressure-reducing valve having an inlet port connected to the said high-pressure side, an outlet port connected to said chamber, and a pilot port, means operable in said pressure-reducing valve whereby the pressure at said pilot port determines the pressure at said outlet port; a pressure-relief valve having an inlet port connected to said chamber, an outlet port connected to said low-pressure side, and a pilot port, means operable in said pressure-relief valve whereby the pressure at said inlet port of said pressure-relief valve is determined by the pressure at its said pilot port; a pressure-control valve having an outlet side connected to said low-pressure side and an inlet side and having means operable to maintain a first predetermined pressure differential between said inlet and outlet sides in an injecting mode and to maintain a second predermined pressure differential between said inlet and outlet sides in a clamping mode; and function-control means including a valve having a first connection coupled to said inlet side and second and third connections each coupled to a respective one of said pilot ports and operable between a filling position connecting said pilot port of said pressure-relief valve to said pressure-control valve and an injecting/holding position connecting said pilot port of said pressure-reducing valve to said pressure-control valve.

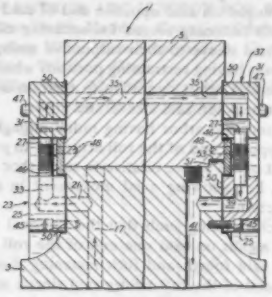
4,019,846
ROLLS IN A BRIQUETTING MACHINE OR LIKE MACHINES

Joseph Irwin Greenberger, Pittsburgh, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 584,240, June 5, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,500

Int. Cl.² B28B *17/00*

U.S. Cl. 425—194 **1 Claim**



1. In a briquetting machine, an improvement for controlling the temperature of the working surface of a composite roll thereof having an axis of rotation relative to said machine consisting of:

a passageway within the roll to permit termperature control medium to flow axially in an arbor on the roll,

egress and ingress radial passageways within said arbor to permit temperature control medium to flow from and to said axial passageway to and from the outer portion of said arbor,

a readily removable and replaceable sleeve arranged concentric about and supported by said arbor, said sleeve having an outer working surface,

a system of passageways, including a series of axially spaced passageways, located beneath said working surface and formed in said sleeve to permit temperature control medium to flow continuously through said sleeve in a manner to control the temperature of said working surface, at least a first and a second of said passageways of said system of passageways terminating adjacent opposite ends of the roll; said series of axially spaced passageways formed into a number of distinct groups,

a first number of manifold assemblies arranged external of and at one end of the roll,

a second number of manifold assemblies arranged external of and at the opposite end of the roll,

said first and second manifold assemblies connecting said radial passageways to said first and second passageways of said system of passageways to create an uninterrupted flow of temperature control medium through said arbor and said sleeve of the roll and serving as entry and delivery ports respectively for said groups,

a set of first and second manifold assemblies being connected to each group of said groups of axially spaced passageways,

said first manifold assemblies having first medium receiving means for receiving medium from said radial passageways for transfer to second medium receiving means,

first fastening means for securing said receiving means to said arbor,

a said second medium receiving means in each said first manifold assemblies for transferring medium to said first and second passageways of said system of passageways from said first receiving means,

second fastening means for securing said other receiving means to said sleeve,

said second manifold assemblies having third medium re-

ceiving means for transferring medium from said first and second passageways of said system of passageways to fourth medium receiving means,

said fourth medium receiving means in each said second manifold assemblies for receiving medium from said third receiving means for transfer to said radial passageways,

said second manifold assemblies having third and fourth fastening means similar in function to said first and second fastening means,

a ring means arranged on said one end of the roll, and a ring means arranged on said opposite end of said roll,

fifth and sixth fastening means for securing different ring means to said sleeve to their respective ends,

said ring means having restraining portions which abut both said sleeve and arbor operative to restrain axial relative movement between said sleeve and arbor,

said sleeve and said arbor having radial engaging surfaces on said opposite end of the roll arranged to prevent axial movement of the sleeve relative to said arbor in one axial direction, but allowing axial movement in an opposite axial direction,

the construction being such that the removal of said first fastening means on said one end of the roll and the removal of said fourth and fifth fastening means on said opposite end of the roll allows said sleeve and said first manifold assemblies on said one end to be remmoved as a unit from said arbor while the second manifold assemblies on said opposite end remains attached to said arbor by said third fastening means.

4,019,847

APPARATUS FOR FORMING A REFRACTORY LINING FOR A CONTAINER

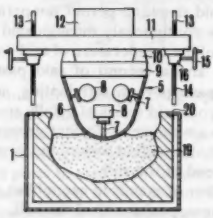
Hiroyuki Imai; Hidenobu Itoi; Hiromu Shimizu, all of Himeji, and Yukio Kuroda, Hyogo, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 614,906

Claims priority, application Japan, Oct. 7, 1974, 49-114670

Int. Cl.² B28B *1/10, 7/00*

U.S. Cl. 425—421 **10 Claims**



1. In apparatus for forming a refractory lining for a container comprising a vibration-pressing mold to be placed on a refractory mix charged in the container, the outer shell of said mold being composed of a metal plate, a plurality of vibrators attached respectively to a vibration-transfer frame provided on the inside of said metal plate, an anti-vibration member provided on the upper end of said mold, a supporting frame for supporting said mold provided on said anti-vibration member, and a guide member for maintaining said mold in a stabilized posture during its sinking-down movement into said refractory mix, the improvement wherein said mold is portable and is placed on the refractory mix charged in the container to be lined, said mold is sinkable by its own weight, said supporting frame is extended beyond the width of the mold, a weight is placed on said supporting frame, a plurality of guide members extending essentially vertically to said supporting frame are provided so as to move up and down by means of a driving member attached thereto, and a changeable space is established between the lower sides of said guide members and the upper face of said container.

4,019,848

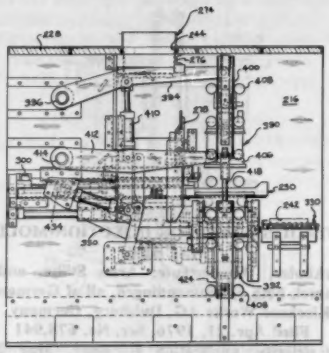
BLOCK MOLDING MACHINE HAVING A PALLET FEEDER AND EJECTOR

Milo G. Balhorn, Waterloo, Iowa, assignor to Old Fort International, Inc., Adrian, Mich.

Division of Ser. No. 544,137, Jan. 27, 1975, Pat. No. 3,961,874. This application Feb. 13, 1976, Ser. No. 657,943

Int. Cl.² B28B *3/04*

U.S. Cl. 425—443 **3 Claims**



1. In a block molding machine, a frame, a moldbox supported by the frame and open at the bottom under which a pallet can be supported during block molding operations, a pallet magazine on the rearward side of said moldbox having a discharge portion on its front side for release of a pallet for transfer to said moldbox, a conveyor extending in a forward direction from said moldbox for receiving a block-loaded pallet from below said moldbox, a strip mechanism supported by the frame and extending under the moldbox for supporting and lowering a block-loaded pallet when the block is stripped from said moldbox and subsequently for raising and supporting against the bottom of the moldbox the next succeeding pallet transferred from said magazine, and an ejector and pallet feed mechanism mounted on said frame for reciprocal movement between forward and rearward positions, said ejector and pallet feed mechanism including a pallet feeder having an ejector element operable when said feed mechanism is moved forward for transferring forward on said conveyor a block-loaded pallet positioned below said moldbox, and a feeder element for engaging and cooperaing in transferring forward simultaneously the next succeeding pallet in said magazine to a position under said moldbox for subsequently being supported by said strip mechanism, said pallet feeder and said frame have cooperating guide means so that when said ejector and pallet feed mechanism is moved forward the pallet feeder will be elevated to position the next succeeding pallet adjacent to the underside of the moldbox.

4,019,849

RAPID PARISON COOLING IN INJECTION BLOW MOLDING

John Jerome Farrell, Greenbrook, N.J., assignor to Consupak, Inc., Morristown, N.J.

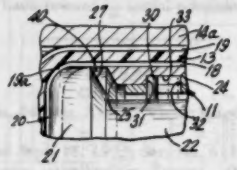
Filed Oct. 31, 1975, Ser. No. 627,508

Int. Cl.² B29C *17/07*

U.S. Cl. 425—445 **13 Claims**

1. An apparatus for cooling a parison having a neck portion and a close-ended tubular body portion comprising a core rod having the parison extending substantially the entire length thereof and the parison being supported at the neck portion, a mold in which the core rod and parison are situated with a space between the parison body portion and the core rod and a space between the parison body portion and the mold, the core rod comprising means to circulate a first cooling fluid in

the space between the core rod and parison along substantially the entire inside surface of the parison body portion, and the mold comprising means to circulate a second cooling fluid in the space between the parison and the mold along substantially the entire outside surface of the parison body portion, said two cooling fluid means being operable at about the same time so that said parison body portion is spaced from the core rod and the mold by the two cooling fluids.



4,019,850

METHOD FOR THE STORAGE OF LIQUEFIED GAS IN THE PRESENCE OF A FIBROUS ADSORBANT SUPPORT

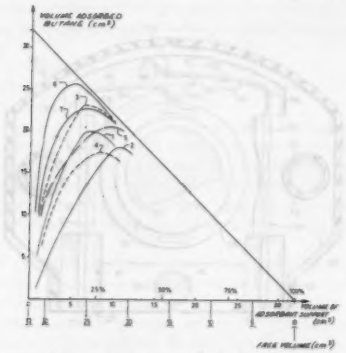
Georges Tallonneau, Avon, France, assignor to S.T. Dupont, Paris, France

Filed Oct. 15, 1974, Ser. No. 515,035

Claims priority, application France, Oct. 12, 1973, 73.36495

Int. Cl.² F17C 7/02

U.S. Cl. 431—12 **8 Claims**



1. A process of storing a liquified gas for distribution exclusively in gaseous form into an atmosphere whose pressure is less than that of the storage chamber, the liquified gas being combustible and being stored in the storage chamber constituted by a feed reservoir of a device having a burner directly connected to an evacuation orifice of the reservoir without interposition of auxiliary gas evaporation apparatus and without auxiliary expansion apparatus, said process comprising disposing in the storage chamber conjointly with the stored liquified gas, a quantity of a fibrous capillary adsorbant support whose fibers have a diameter between 0.5 and 25 microns, the minimum value of the actual volume of the support, constituted by the volume remaining after deduction of all interstitial spaces, going from (a) 2% of the volume of the storage chamber for a capillary support having loosely entangled fibers, in a layer, of a diameter of about 0.5 microns to (b) 12% of the volume of the storage chamber for a capillary support having entangled fibers, in a layer, of a diameter of 25 microns, the amount of liquified gas disposed in the chamber corresponding to the volume of the support such that all the liquefied gas is adsorbed by the support and only gaseous form of the liquefied gas is discharged upon opening of the evacuation orifice, the said minimum value of the actual volume of the support being of such magnitude to be sufficient to insure the distribution of the liquefied gas exclusively in gaseous form to the burner without auxiliary gas evaporation apparatus and auxiliary expansion apparatus.

4,019,851

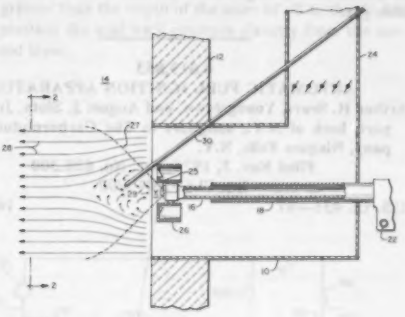
HIGH ENERGY ARC IGNITOR FOR BURNER

Donald Arthur Smith, Haddan, Conn., and John Joseph Marshall, Feeding Hills, Mass., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Sept. 22, 1975, Ser. No. 615,324

Int. Cl.² F23Q 3/00

U.S. Cl. 431—2 **6 Claims**



1. In combination, a first longitudinal pipe supplied with combustion air at its inlet end and open at its discharge end, a second pipe positioned axially within the first pipe, said second pipe being supplied at a first end with a hard to ignite liquid fuel, the second pipe having a tip at its second end containing fuel passages located such that the fuel is discharged in the shape of a hollow conical curtain, baffle means transverse to the second pipe and surrounding it adjacent to the tip such that eddy currents of air are formed on the downstream side thereof, some of the eddy currents breaking through the curtain of fuel and forming a recirculation zone having an inner edge inside the conical curtain flowing back to point directly in front of the tip of the second pipe, and ignition means positioned within the conical curtain and along the inner edge of the recirculation zone for igniting the liquid fuel.

4,019,852

QUIET AND SMOKELESS FLARING OF OFF-GASES CONTAINING HYDROCARBONS

Gerd Hemmer, Ludwigshafen; Klaus Hess, Bad Durkheim; Rolf Becker, Luetzelsachsen, and Klaus Liebhaber, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Oct. 20, 1975, Ser. No. 623,932

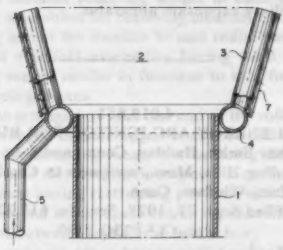
Claims priority, application Germany, Oct. 23, 1974, 2450205

Int. Cl.² F23G 7/06

U.S. Cl. 431—5 **8 Claims**

1. A process for the quiet and smokeless flaring of combustible process gases from a flare stack which comprises discharging from the end of a flare stack a stream of a combustible process gas into a mixing zone located within a series of injector tubes arranged in a circle about and extending beyond said end of the flare stack, and discharging through respective longitudinal passages in the outwardly facing sides of said

tubes and then about said tubes toward said mixing zone a stream of propellant gas for drawing atmospheric air between



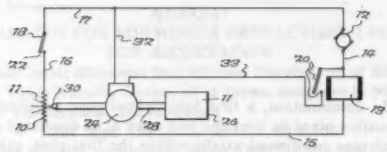
said tubes and through said circle into said stream of combustible gas.

4,019,853

AUTOMATIC FUEL IGNITION APPARATUS

Arthur H. Sears, Youngstown, and August J. Siuta, Jr., Lockport, both of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,300
Int. Cl.² F23N 5/00
U.S. Cl. 431—67 **16 Claims**



1. Apparatus for automatic fluid fuel ignition, comprising:
a. an electrical resistance igniter means for igniting fluid fuel;
b. fluid fuel supply means including a normally closed fluid fuel valve;
c. fluid fuel flow means for flowing the fuel proximate the igniter means when the fluid fuel valve is open; and
d. valve opening means comprising an electrically activated time delay relay, electrically connected in series to the igniter means, for opening the fluid fuel valve, sufficient electrical current to activate said relay passing through said relay only after the igniter means is at a temperature above the ignition temperature of the fluid fuel.

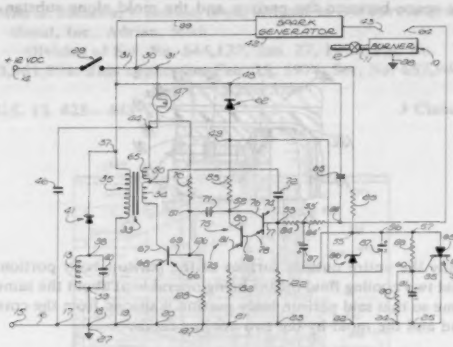
4,019,854

DIRECT SPARK IGNITION SYSTEM UTILIZING GATED OSCILLATOR

Elmer A. Carlson, Agoura; Joseph G. Raffaelli, Granada Hills, and Ronald A. Gann, La Crescenta, all of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 27, 1976, Ser. No. 661,938
Int. Cl.² F23H 5/12
U.S. Cl. 431—80 **2 Claims**

1. A direct spark ignition system, said system comprising: a fluid fuel burner; an electrically operable valve connected to said burner to control the fuel admitted thereto; an oscillator; a timing circuit actuable to cause said oscillator to oscillate for a predetermined period; a spark generator connected from said oscillator to ignite fuel emanating from said burner; and a flame sensor to sustain oscillations of said oscillator after said period when a flame exists at said burner, said oscillator including an amplifier having a feedback path with a gate connected therein, said flame sensor being connected to said gate to cause the same to close and to complete said feedback path in manner to cause said oscillations to be sustained after said



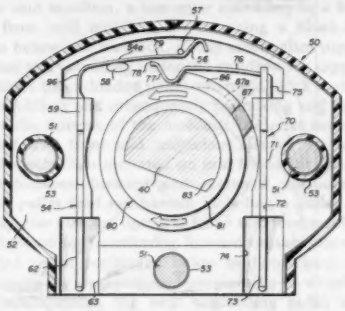
period when a flame exists at said burner, said flame sensor holding said gate open in the absence of flame to allow said oscillations to die out.

4,019,855

ELECTRICAL SWITCH FOR IGNITION IN GAS APPLIANCES

Charles Carl Camillo, Western Springs, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Oct. 14, 1975, Ser. No. 622,216
Int. Cl.² F23Q 7/12
U.S. Cl. 431—256 **7 Claims**



1. An electrical switch for association with a gas valve comprising housing means, a rotatable cam body disposed on said housing means, said cam body being of a predetermined width and having an axis of rotation associated therewith, a cam guide on said cam body and extending transversely of the axis of rotation thereof and along a predetermined arcuate extent of an outer surface of said cam body, a cam lobe on said cam body adjacent said cam guide at one side thereof, fixed contact means secured within said housing means and spaced from said cam body, and shiftable contact means secured within said housing means and adjacent said cam body for selective engagement with said fixed contact means, said shiftable contact means being shiftable laterally and deflectable vertically, said cam guide being constructed for engaging said shiftable contact means and shifting said shiftable contact means laterally toward said cam lobe upon rotation of said cam by a predetermined amount in one direction, said cam subsequently deflecting said shiftable contact means vertically for actuation thereby into electrical contact with said fixed contact means for a predetermined interval of rotation of said cam body from its initial position, which initial position corresponds to a closed valve, when said cam body is rotated by an additional predetermined amount in said one direction, and

said cam guide being constructed for engaging and shifting said shiftable contact means laterally away from said cam lobe for preventing deflection of said shiftable contact means in said vertical direction by said cam lobe and electrical contact of said shiftable contact means with said fixed contact means when said cam body is rotated in the opposite direction to said one direction, back toward its initial position.

4,019,856

OIL LAMP

Jean R. Lacroix, 167 bis, Avenue Victor Hugo, 75116 - Paris, France

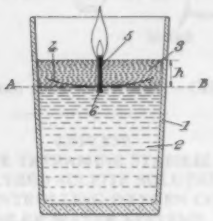
Filed Sept. 15, 1975, Ser. No. 613,539

Claims priority, application France, Oct. 22, 1974, 74.35445

Int. Cl.² F23D *3/02*

U.S. Cl. 431—298 **11 Claims**

1. An oil lamp comprising a container containing a layer of oil on top of an incombustible liquid, and at least one float in which is fitted at least one upstanding wick, wherein each float rests continuously on the oil-incombustible liquid interface regardless of the depth of the oil layer or complete submergence of the float in the oil, each wick having an initial length



which is greater than the depth of the layer of oil so that in the floating position the said wick emerges directly from the surface of said layer.

4,019,857
PROCESS FOR THE COLORATION OF HYDROPHOBIC CHEMICAL FIBERS BY METALLIFEROUS DYESTUFFS OF CATIONIC CHARACTER

Antoine Georges Leon Jacques Breda, Bois Guillaume, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

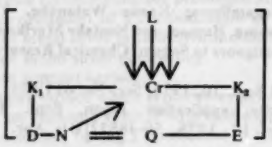
Filed Mar. 11, 1974, Ser. No. 450,112

Claims priority, application France, Mar. 20, 1973, 73.09880

Int. Cl.² C09B *29/38, 29/00;* **D06P** *1/13, 1/02*

U.S. Cl. 8—42 C **17 Claims**

1. A process for dyeing or printing synthetic or artificial hydrophobic textile fibers based on polyesters or cellulose triacetate in an aqueous medium containing a dyestuff having the formula:



in which N is nitrogen,

Q represents a nitrogen atom or a methine group,

D and E each represent a radical not containing an ionic group and having an aromatic, heterocyclic or aliphatic character, this radical carrying in the vicinal position with respect to the grouping —N=Q— a chelating group K_1 or K_2;

Cr is trivalent chromium;

K_1 represents —O— or —COO—;

K_2 represents —O— or —NR—;

R being an alkyl or aryl substituent or a hydrogen atom;

L represents a group of 3 neutral monodentate ligands, or neutral bidentate ligand and a neutral monodentate ligand, or a neutral tridentate ligand; and

A represents a simple anion carrying one negative charge, the cationic part of which dyestuff does not contain an ionized group,

which process comprises contacting said fibers with an aqueous dyeing medium at a pH of 3 to 7 and a temperature at least equal to 80° C containing a complexing agent sparingly soluble in water and not containing an ionized group and more soluble in the fiber than in the aqueous dyeing medium, and with the premetallized dyestuff;

said complexing agent being capable of fixation on the metal of the premetallized dyestuff with liberation of a proton and of chelating agent forming a five- or six-membered ring with the chromium of the dyestuff complex thereby rendering it neutral.

4,019,858
CONCENTRATED DIRECT DYE SOLUTION AND PROCESS THEREFOR

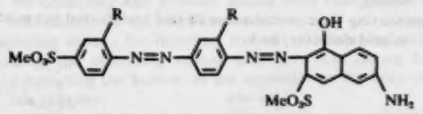
Joseph Clyde Conger, Sr., Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 21, 1975, Ser. No. 579,360

Int. Cl.² C09B *67/00;* **D06P** *1/645*

U.S. Cl. 8—85 R **4 Claims**

1. A concentrated dye solution comprising per 100 parts by weight thereof, 54–55 parts of water, 17–18 parts of process salts, 15–16 parts of urea and 12–13 parts of a dye having the formula:



where Me is an alkali metal and R is H, $—CH_3$ or $—C_2H_5$.

4,019,859
TRIETHYLENE TETRAMINE STABILIZATION OF COBALT CATALYZED SULFITE SOLUTIONS AND USE THEREOF IN CONTROLLING OXYGEN CORROSION IN BOILER WATER SYSTEMS

Walter M. Lavin, Horsham; James I. McFarlane, Warminster, and Dennis L. Rose, Fairless Hills, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Sept. 20, 1976, Ser. No. 724,443

Int. Cl.² C23F *11/04;* **C02B** *1/23, 1/10, 5/06*

U.S. Cl. 21—2.7 R **18 Claims**

1. A method of stabilizing an aqueous solution of an alkali metal sulfite or bisulfite containing a water-soluble cobalt catalyst, which solution with an increase of pH will experience the precipitation of a said cobalt as its sulfite salt, which method comprises incorporating in said solution a stabilizing amount of triethylene tetramine.

15. A method of controlling oxygen corrosion in a boiler water system due to the dissolved oxygen in the water which comprises adding to said boiler water an oxygen scavenging amount of a composition comprising an alkali metal sulfite or bisulfite, a water-soluble cobalt catalyst, and a stabilizing amount of triethylene tetramine.

4,019,860
ANALYTICAL REAGENT FOR CYANIDE

Wolfgang Fischer, and Renate Linck, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Germany

Filed Apr. 5, 1976, Ser. No. 673,490

Claims priority, application Germany, Apr. 19, 1975, 2517483

Int. Cl.² C07D *239/22;* **C09B** *57/00;* **G01N** *21/02, 31/00*

U.S. Cl. 23—230 R **2 Claims**

1. In a method for the colorimetric determination of cyanide in an unknown wherein the cyanide is reacted with chloramine-T to form cyanogen chloride, said cyanogen chloride is reacted with pyridine to form glutaconic dialdehyde, said dialdehyde is reacted with an organic compound to form a colored compound, and the content of cyanide in said solution is determined from the color intensity of said colored compound,

wherein the improvement comprises employing as said organic compound, N,N′-dialkyl-barbituric acid, the alkyl groups being each of 1–6 carbon atoms.

4,019,861
METHOD AND APPARATUS FOR MEASUREMENT OF CO_2 AND CHLORIDE IN BODY FLUIDS

Harald Dahms, Ossining, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 30, 1976, Ser. No. 701,164

Int. Cl.² G01N *33/16, 27/30, 27/42*

U.S. Cl. 23—230 B **39 Claims**

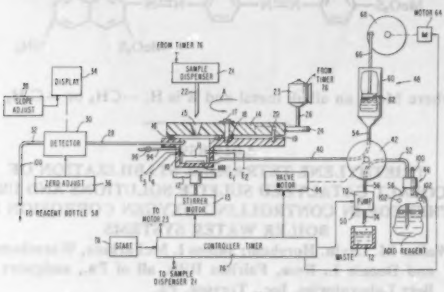
1. A method for measuring CO_2 and chlorides in a sample of body fluid, comprising the steps of:

reacting said sample and a reagent in a vessel to release CO_2 into a gas space filled substantially with air at essentially atmospheric pressure to produce a mixture of said released CO_2 and air, said gas space having a volume greater than the volume of sample in said vessel,

transferring at least a portion of said mixture in said gas

space to a detector by adding a displacing liquid to said vessel,

measuring the concentration of said transferred gas mixture in said detector, and



coulometrically titrating said sample and reagent in said vessel to determine chloride concentration in said sample.

4,019,862

CO_2 MEASUREMENT AND REAGENTS THEREFOR

Harald Dahms, Ossining, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 23, 1976, Ser. No. 698,868
Int. Cl.² G01N 33/16
U.S. Cl. 23—230 B 35 Claims

9. A method for analyzing CO_2 in body fluids comprising the steps of

adding an acid reagent to a sample of said body fluid to release CO_2 thereform into a gas space, said reagent being comprised of an acid having a pH less than 4 and a vapor pressure not in excess of 10mm mercury together with an ether of a fatty alcohol and polyoxyethylene having the structure $R—O—(C_2H_4—O)_nH$, and

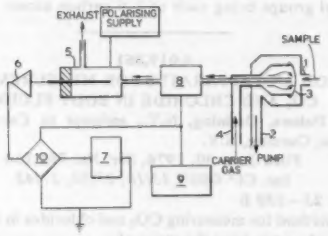
displacing said released CO_2 to a detector where a sample of said CO_2 is measured.

4,019,863

SELECTIVE DETECTION OF A CONSTITUENT IN AN ATMOSPHERE

Anthony Jenkins, 54 Finchams Close, Linton, Cambridgeshire, and James Ephraim Lovelock, Bowerchalke, Salisbury, Wiltshire, both of England

Filed Apr. 8, 1975, Ser. No. 566,057
Claims priority, application United Kingdom, Apr. 8, 1974, 15556/74
Int. Cl.² G01N 1/22, 33/22
U.S. Cl. 23—232 E 16 Claims



1. A method for selectively distinguishing a constituent of interest from the remaining constituents in a gas sample, comprising:

continuously flowing sample gas through a switching device into a detector;

heating the switching device:

alternately raising and lowering the temperature of the gas flow furnished by the switching device to said detector above and below a temperature at which the flow to the detector of the consitutent of interest is interrupted without affecting the flow of the remaining consittituents in the sample gas, such alternating raising and lowering of the temperature including periodically switching a condition of the switching device;

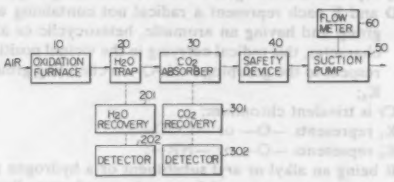
monitoring output signals from the detector and correlating such detector output signals with the switching of said switching device and from such correlation indicating the presence and concentration of the constituent of interest in the gas flow.

4,019,864

METHOD FOR MEASURING RADIOACTIVITIES OF TRITIUM AND CARBON-14 IN SAMPLE AIR AND APPARATUS FOR PERFORMING THE SAME METHOD

Tomo Saito, Sagamihara; Kazuo Watanabe, Yokohama; Yumiko Nishiyama, Hatano, and Naotake Morikawa, Tokyo, all of Japaa, assignors to Sagami Chemical Research Center, Tokyo, Japan

Filed Sept. 10, 1975, Ser. No. 611,958
Claims priority, application Japan, Sept. 10, 1974, 49-104215; Apr. 10, 1975, 50-48522[U]; Apr. 10, 1975, 50-43624
Int. Cl.² G01N 31/12; G01T 1/167
U.S. Cl. 23—253 PC 4 Claims



1. A radioactive measuring apparatus for tritium and carbon-14 contained in a flowing gas sample, comprising

an oxidation means having an inlet port and an outlet port for continuously converting compounds containing hydrogen and carbon into water and carbon dioxide;

at least one water collecting means comprising a cold-trap having an inlet port connected to said outlet port of said oxidation means and an outlet port, for collecting the water content of the oxidized gas;

at least one carbon dioxide collecting means having an inlet port connected to said outlet port of said water collecting means and an outlet port and containing monoethanol amine to absorb carbon dioxide in the output gas from said water collecting means wherein said carbon dioxide collecting means comprises a syphon and an upstanding body portion defined by portion and cylindrical wall with an inlet port at the bottom thereof and an outlet port at an upper end thereof, one end of said syphon portion being connected to said outlet port of said cold-trap and the other end of said syphon portion being connected to said inlet port of said upstanding body portion, the inner surface of said wall being provided with a plurality of protrusions, whereby, when monoethanol amine is supplied from said outlet port of said upstanding body portion into the interior of said body portion up to a level corresponding to the height of said syphon portion and then the gas containing carbon dioxide is fed through said syphon to said inlet port of said body portion, the gas rises as bubbles through monoethanol amine, each of the bubbles is subdivided by said protrusions on the way of the rising thereof and broken at around the level of monoethanol amine to facilitate the dissolution of carbon dioxide into monoethanol amine;

a suction pump means having an inlet port connected to said outlet port of said carbon dioxide collecting means for producing a flow of the gas through the series connection of said oxidation means, said water collecting means and said carbon dioxide collecting means; and

means for measuring radioactivities of tritium and/or carbon-14 contained in the water and/or carbon dioxide collected by said water collecting means and said carbon dioxide collecting means.

4,019,865

H_2S INDICATOR

Robin A. Sinclair, St. Paul, Minn., and Eileen A. Glasspoole, Hudson, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 13, 1976, Ser. No. 658,127

Int. Cl.² G01N *21/12, 31/22*

U.S. Cl. 23—253 TP **10 Claims**

1. A device for indicating the prolonged attainment within a gaseous environment of a concentration of H_2S sufficient to tarnish free metal silver in said environment before tarnishing of said free metal silver comprising:

1. a base support surface,

2. an upper surface which is not water penetrable forming at least an enclosed volume with said support surface, said upper surface having a translucent or transparent portion exposing at least a part of said enclosed volume and allowing penetration of vapor through said upper surface so that penetrating vapor will contact:

3. a light-stable composition within said enclosed volume which undergoes a visible light-stable change which is a change in tone or color or intensification of its tone or color when reacted with H_2S, said composition undergoing said visible change within 1 day when exposed to a constant concentration of 1 part per million of H_2S, and said composition in said enclosed volume having free vapor access to its surrounding environment.

4,019,866

RECIRCULATING REACTION APPARATUS FOR CONTINUOUS PREPARATION OF A POLYAMIDE

Iqbalsingh Jaswal, Copper Cliff, and Kalev Pugi, Kingston, both of Canada, assignors to Du Pont of Canada Limited, Montreal, Canada

Division of Ser. No. 392,511, Aug. 29, 1973, Pat. No. 3,900,450. This application Jan. 10, 1975, Ser. No. 540,277

Claims priority, application Canada, Mar. 5, 1973, 165282

Int. Cl.² B01J *1/00*

U.S. Cl. 23—260 **4 Claims**

1. Apparatus for the continuous preparation of a polyamide from a polyamide forming aqueous salt solution prepared from a diamine and a dicarboxylic acid comprising:

rectification column having a base section, a top portion, and a mid-section;

a combination partial condenser-preheater which is located within said top portion and has an inlet line for the polyamide forming aqueous salt solution and a line for feeding the salt solution from the condenser-preheater to the column mid-section, and which is for condensing a portion of vapor in the top portion of the rectification column for reflux and for simultaneously preheating the polyamide forming aqueous salt solution to be fed to said mid-section;

a separator comprising the base section of the rectification column, said separator having a bottom portion and a midportion;

a vertical thermosyphon reboiler having a bottom and an upper end;

a recirculating loop connecting the bottom of the separator to the bottom of the reboiler;

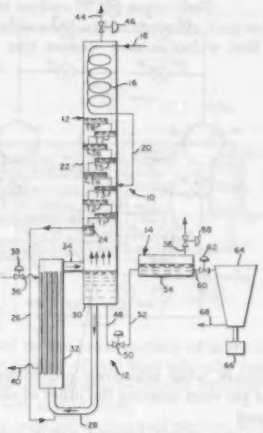
a vapor pipe connecting the reboiler at its upper end to the midportion of the separator;

collecting means located in the column above the separator for collecting salt solution mixed with reflux from the mid-section of the rectification column;

injecting means for injecting the salt solution and reflux from the collecting means into the recirculating loop connecting the bottom of the separator to the bottom of the reboiler;

a vent line in the top portion of the rectification column for venting uncondensed vapor;

control means for venting uncondensed vapor from the separator through the vent line in the top portion of the rectification column and for maintaining a predetermined pressure therein;



an exit line connected to the bottom portion of the separator;

control means for maintaining a constant level of prepolymer in the separator and for withdrawing a controlled flow of prepolymer through the exit line;

heating means in the reboiler for partially vaporizing and partially reacting the salt solution to form a prepolymer and a vapor; and

control means for the heating means in the reboiler for maintaining the prepolymer in the separator at a predetermined temperature.

4,019,867

APPARATUS FOR THE CONTINUOUS PURIFICATION OF GASES CONTAMINATED WITH TRITIUM

Hans Fabian, Hanau, Germany, assignor to Nukem G.m.b.H., Grossauheim, Germany

Filed Dec. 27, 1973, Ser. No. 428,697

Claims priority, application Germany, June 22, 1973, 7323277[U]

Int. Cl.² B01D *53/00*; B01J *8/00*; C01B *1/30, 1/32*

U.S. Cl. 23—260 **4 Claims**

1. Apparatus for the continuous purification of gases contaminated with tritium by the catalytic burning of tritium enriched hydrogen in a catalytic furnace, said apparatus comprising

a source of tritium contaminated gas,

at least first and second gas storage containers,

at least one catalytic furnace for burning tritium from tritium contaminated gas and hydrogen to form water,

a pump in operative communication with each of said gas storage containers and said catalytic furnace,

first conduit means for operatively connecting said source to said first and second storage containers,

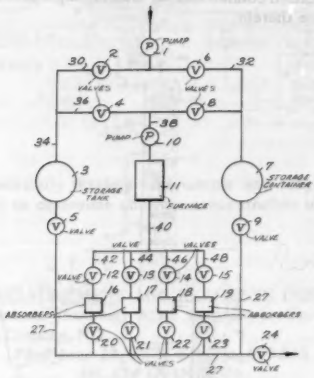
second conduit means for connecting said storage containers to each other,

third conduit means for connecting said second conduit means to said catalytic furnace, said pump being disposed in said third conduit means,

means for absorbing the fluid water formed in said catalytic furnace, said means including at least one absorption unit,

fourth conduit means connecting said absorption unit with said furnace,

first valve means disposed in said first conduit means for permitting gas contaminated with tritium to pass from said source of contaminated gas to one of said storage containers, while selectively preventing tritium contaminated gas from entering the other of said storage containers, and



second valve means located within said second conduit means for selectively permitting gas to pass from said first storage container to said catalytic furnace while selectively preventing the gas from passing from said second storage container to said catalytic furnace and for reversing the process whereby gas is prevented from passing from said first storage container to said catalytic furnace and gas is permitted to pass from said second storage container to said furnace.

4,019,868

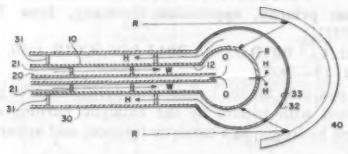
SOLAR HYDROGEN GENERATOR

Daniel I. Sebacher, Seaford, and Alexander P. Sabol, Williamsburg, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 24, 1976, Ser. No. 669,928

Int. Cl.² B01J *7/00;* **C01B** *1/00*

U.S. Cl. 23—281 **5 Claims**



1. Apparatus for using solar energy to manufacture hydrogen gas by dissociating water molecules into hydrogen and oxygen molecules comprising:

an inlet tube means for transporting water;

a hollow globe means affixed to one end of said inlet tube means for receiving the water; said globe means being pervious to hydrogen molecules and being impervious to oxygen molecules and undissociated water molecules;

an outlet tube means extending into said globe means and being concentrically positioned within said inlet tube means;

a reflector means for concentrating solar energy on said globe means thereby heating the water contained in said globe means to the dissociation temperature of said water whereupon the water decomposes into hydrogen and oxygen molecules; the hydrogen molecules permeate through said globe means and the oxygen molecules and undissociated water enter said outlet tube means for removal from said globe means; a collector tube means for collecting the hydrogen molecules after the hydrogen molecules pass through said globe means;

said collector tube means having an enlarged closed end which encases said hollow globe means and a tubular length extending from said enlarged closed end concentrically positioned about said inlet tube means; thereby transferring heat from the hydrogen molecules to the water in said inlet tube means and

wherein said collector tube means is constructed of material transparent to solar radiation to thereby permit solar radiation to pass through said collector tube means to reach said hollow globe means.

4,019,869

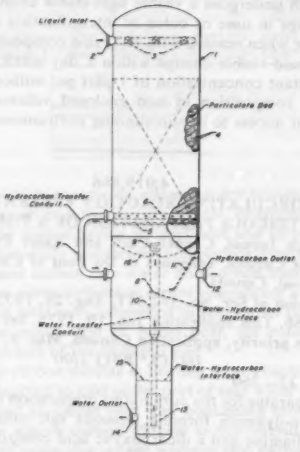
COMBINATION REACTOR-SEPARATOR APPARATUS

J. Wayne Morris, Romeoville, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 10, 1975, Ser. No. 630,601

Int. Cl.² B01J *8/02;* **C10G** *19/00*

U.S. Cl. 23—288 R **4 Claims**



1. A combination catalytic reaction-liquid-liquid separation apparatus for use with liquid reactants which comprises in cooperative combination:

a. an elongated, unitary outer vessel which is vertically orientated about the longitudinal axis thereof, having an internal volume formed by an outer wall and which is separated into an upper chamber and a lower chamber by an imperforate liquid barrier which horizontally traverses said internal volume;

b. a cylindrical bed of catalytic particulate matter comprising charcoal containing 0.1 to 2.0 wt. % metal phthalocyanine located within an upper portion of said upper chamber;

c. a liquid feed stream inlet and distribution means operatively communicating with said internal volume at a point above said bed of particulate matter;

d. a liquid water transfer conduit located within said internal volume and which passes vertically through said imperforate liquid barrier from a first point within a lower

portion of said upper chamber and a cylindrical agitation reducing means located at a point within a lower portion of said lower chamber, said conduit discharging into said reducing means;

e. a liquid hydrocarbon transfer conduit which passes from a higher, second point within said upper chamber to a point within an upper portion of said lower chamber;

f. a liquid water outlet means operatively communicating with said lower portion of said lower chamber; and,

g. a liquid hydrocarbon outlet means operatively communicating with said upper portion of said lower chamber.

4,019,870

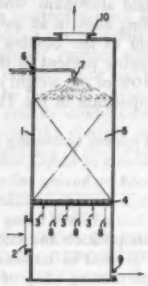
AIR POLLUTION CONTROL OF OXIDES OF NITROGEN

William J. Gilbert, Jr., Manville, N.J., assignor to Croll-Reynolds Company, Inc., Westfield, N.J.

Division of Ser. No. 545,791, Jan. 31, 1975, Pat. No. 3,949,057, which is a continuation-in-part of Ser. No. 327,412, Jan. 29, 1973, abandoned. This application Sept. 10, 1975, Ser. No. 612,198

Int. Cl.² B01J *8/00, 35/04*

U.S. Cl. 23—288 F **2 Claims**



1. An apparatus for removing nitrogen oxides from a gaseous mixture of waste gases containing oxygen and nitrogen dioxide and nitrogen oxide, said gaseous mixture of waste gases containing up to 1% by volume of nitrogen oxides and an oxygen concentration of at least ten times greater than the nitrogen dioxide and nitrogen oxide concentration, comprising a vessel having gas inlet and gas outlet means and inlet and liquid outlet means and containing a knitted wire mesh packing material of stainless steel containing at least 8% Ni and having a diameter of from 0.003 to 0.015 inches, said packing material having from 180 to 800 square feet of surface area per cubic foot of volume, means for supplying to the vessel a liquid selected from the group consisting essentially of water and dilute aqueous alkaline solutions at a flow rate of from 10 to 60 gallons per minute per thousand cubic feet per minute of said gaseous mixture evenly to the upper surface of said packing material, means for supplying said gaseous mixture to the lower surface of said packing material, the volume of said packing material in said vessel and the flow rate of said gaseous mixture being selected whereby a residence time of from 3.5 to 15 seconds for said gaseous mixture to be in the presence of said packing material is maintained.

4,019,871

RECOMBINER APPARATUS

Robert T. Anderson, Jacksonville, Fla.; Henry L. Loy, San Jose, Calif., and William J. Nesbit, Scarborough, Maine, assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 30, 1974, Ser. No. 510,634

Int. Cl.² B01J *8/02*

U.S. Cl. 23—288 K **1 Claim**

1. A recombiner process vessel comprising:

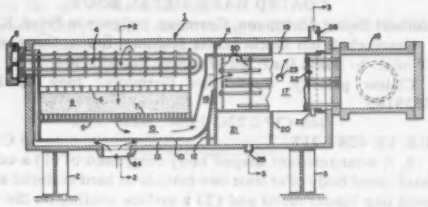
a horizontally disposed, substantially cylindrical outer shell having a process fluid inlet disposed therethrough in a lower portion of said outer shell;

substantially vertical wall means dividing the inner volume of said outer shell into a reaction portion and a condenser portion;

a liner disposed within said outer shell reaction portion, said liner having an arcuate portion substantially symmetric with the lower portion of said outer shell and spaced therefrom to form an annular path therebetween; said arcuate portion disposed above said process fluid inlet;

a preheater tube bundle within said liner and disposed across said arcuate portion whereby said process fluid flows from the inlet to the preheater tube bundle through the annular path formed by the outer surface of the liner and the inner surface of the outer shell;

a catalyst bed supported within the inner liner substantially enclosed by said arcuate portion below said preheater tube bundle;



a plenum formed by the lower surface of said catalyst bed and the inner surface of said liner whereby process fluid flows from said preheater tube bundle through said catalyst bed and into said plenum;

transition means interconnecting said plenum with the condenser portion through said wall means;

a substantially cylindrical condenser shell disposed within said outer shell condenser portion, said condenser shell in fluid communication with said transition means for receiving said process fluid from said plenum;

a coolant tube bundle disposed within said condenser shell;

a drain well formed by the inner surface of said outer shell, said wall means, and the outer surface of said condenser shell, said condenser shell having a drain opening therethrough; and,

a gas outlet through said outer shell in fluid communication with a gas outlet through said condenser shell whereby non-condensible process fluid is removed from said process vessel.

4,019,872

PRODUCING SODIUM CARBONATE MONOHYDRATE FROM CARBONATE SOLUTION INCLUDING ADDITION OF ALUMINUM IONS

John Walden, Hightstown, N.J., assignor to Intermountain Research and Development Corporation, Green River, Wyo.

Continuation-in-part of Ser. No. 436,999, Jan. 28, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,172

Int. Cl.² C01D *7/00;* **B01D** *9/02;* **C01D** *7/12, 7/24*

U.S. Cl. 23—300 **7 Claims**

1. A process for producing high bulk density sodium carbonate monohydrate crystals from an aqueous solution of sodium carbonate, which comprises: adding to said aqueous solution of sodium carbonate a crystal growth additive of at least 30 parts per million soluble aluminum ions, until the soluble aluminum ions in the sodium carbonate solution is about 30 to about 300 ppm soluble aluminum ions, said amount added being in addition to the amount of soluble

aluminum ions inherently present in the sodium carbonate solution prior to the additive addition; crystallizing sodium

carbonate monohydrate from the sodium carbonate solution; and recovering the sodium carbonate monohydrate crystals.

4,019,873

COATED HARD METAL BODY

Norbert Reiter, Mettmann, Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Germany

Filed June 3, 1976, Ser. No. 692,304

Claims priority, application Germany, June 6, 1975, 2525185

Int. Cl.² C22C *29/00*; B22F *7/02*

U.S. Cl. 428—217 **8 Claims**

1. A wear-resistant shaped body comprised of (1) a core of hard metal body of at least one carbide as hard material and at least one binder metal and (2) a surface coating on the core, said surface coating being composed of two superimposed layers including an outer, extremely wear-resistant layer consisting essentially of at least one material selected from the group consisting of aluminum oxide and zirconium oxide, and an inner layer of at least one boride selected from the group consisting of the borides of the elements titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten.

4,019,874

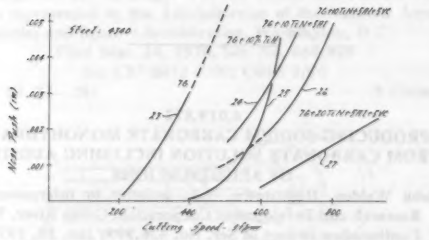
CEMENTED TITANIUM CARBIDE TOOL FOR INTERMITTENT CUTTING APPLICATION

David Moskowitz, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 24, 1975, Ser. No. 634,972

Int. Cl.² C22C *29/00*

U.S. Cl. 75—241 **8 Claims**



1. A composition useful for making a cutting tool, comprising:

a sintered powdered compact having a carbide matrix and a binding alloy, the carbide matrix consisting essentially of titanium carbide, chromium carbide, molybdenum carbide and at least one of the elements selected from the group consisting of vanadium carbide, titanium nitride, the binding alloy consisting essentially of nickel, molybdenum and aluminum, the binding alloy being present in an amount comprising 10–50% of the mass of the compact, the sum of molybdenum in all forms being present in an amount between 25–70% of the binding alloy, aluminum being present in an amount between 2.5–7.5 percentage weight of the binding alloy, vanadium carbide being present in an amount between 5–20% of the mass of the compact, and titanium nitride being present in an amount, when selected, between 2.5–20% by weight of the mass of the compact.

2. A sintered powdered compact useful as a cutting tool, comprising:

a matrix consisting essentially of titanium carbide having controlled dissolved amounts of chromium carbide, molybdenum carbide, and at least one member selected from the group consisting of vanadium carbide and titanium nitride, said compact comprising a binding alloy phase consisting essentially of nickel dissolved amounts of molybdenum and at least one member selected from the group consisting of aluminum and chromium, the binding alloy being present in an amount comprising 10–50% of the mass of the compact, said vanadium carbide, when selected, being present in said compact in an amount between 5–20% of the mass of the compact, and titanium nitride, when selected being present in an amount of 2.5–20% of said compact, said molybdenum being present in said binder in an amount between 25–70% of the binding alloy, said aluminum, when selected being present in the binding alloy in an amount between 2.5 and 6.85% by weight of the binding alloy, and chromium when selected being present in the binding alloy in an amount about 10% of the weight of the binding alloy.

7. A sintered composition of the TiC-Ni-Mo system type, comprising:

the matrix of said system consisting essentially of TiC with some minor amounts of Mo_2C, said matrix being particularly characterized by having selected dissolved amounts of either vanadium carbide or titanium nitride, said vanadium carbide when selected being present in the range of 5–10% of the composition and said titanium nitride when selected being present in an amount of 5–10% of the composition, the binding alloy of said system consisting essentially of molybdenum nickel and a controlled amount of dissolved aluminum at least when said vanadium carbide is selected, said binding alloy constituting 10–50% of the mass of the sintered composition and the sum of molybdenum and molybdenum carbide being present in an amount between 25–70% of the binding alloy.

4,019,875

ALUMINUM-COATED NICKEL OR COBALT CORE FLAME SPRAY MATERIALS

Ferdinand J. Dittrich, Massapequa; George J. Durmann, Farmingdale, and Herbert S. Ingham, Jr., Northport, all of N.Y., assignors to Metco, Inc., Westbury, N.Y.

Continuation-in-part of Ser. No. 377,152, July 6, 1973, abandoned. This application June 13, 1975, Ser. No. 586,784

Int. Cl.² B23P *3/00*; B21C *37/00*; B05B *7/20*

U.S. Cl. 428—570 **26 Claims**

1. A flame spray powder material in the form of a composite suitable for flame spraying formed of at least two metal components, said material comprising:

a. a first core powder component, which core component consists essentially of a self-fluxing alloy which consists essentially of at least about 40% of its weight of nickel or cobalt and about 1 to 6% by weight boron, and

b. a coating component of fine aluminum powder on said core, which powder coating is held to said core by a binder, the core component being present in an amount of about 66 to 99% by weight of the combined weight of the first and second components, said component being in the form of a structurally integral unit where each particle of core component has bonded thereto the coating component, said spray material additionally containing in the form of a blend therewith up to about 20% by weight of a third component comprising nickel.

4,019,876

ELECTRICAL CONTACT ELEMENT AND METHOD OF PRODUCING THE SAME

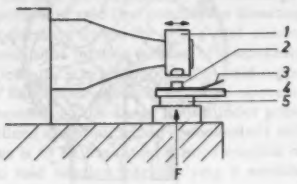
Dieter Stöckel, Pforzheim, and Hans-Jürgen Oberg, Kelten-Dietlingen, both of Germany, assignors to G. Rau, Pforzheim, Germany

Filed Apr. 19, 1976, Ser. No. 678,383

Claims priority, application Germany, Apr. 19, 1975, 2517347

Int. Cl.² B32B *15/20*; B23K *21/02*

U.S. Cl. 428—621 9 Claims



1. An electrical contact element comprising at least one contact piece having a contact surface for making selective electrical connection with a corresponding contact surface of a contact piece on another contact element, a carrier for supporting the or each contact piece and to which the or each contact piece is joined by means of ultrasonic welding, and an intermediate layer of readily cold-weldable metal material which is inserted between the contact piece and the carrier prior to the ultrasonic welding of the or each contact piece to the carrier.

4,019,877

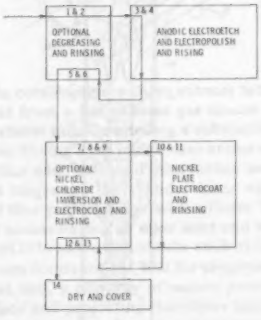
METHOD FOR COATING OF POLYIMIDE BY ELECTRODEPOSITION

William R. Gass, Pittsburgh; Luciano C. Scala, Murrysville, and David C. Phillips, Penn Hills Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 21, 1975, Ser. No. 624,352

Int. Cl.² C25D *13/06*; B23P *3/00*

U.S. Cl. 428—626 14 Claims



9. A method of coating the surface of a copper substrate comprising the steps of:

A. cleaning the substrate in a degreasing solution and rinsing with water,

B. microsmoothing the copper substrate surface by making the surface a positive electrode in an acid bath selected from the group consisting of phosphoric acid and sulfuric acid, said bath having a pH of from about 0.25 to 2.0, at a current density of between 100 amp./sq. ft to 2,000 amp./sq. ft. to dissolve copper and to provide a substantially smooth copper surface, and rinsing with water,

C. placing the copper substrate in a nickel containing bath of nickel chloride, making the substrate a cathode, and applying current effective to reduce any oxides present to copper metal and to electrocoat the substrate with a nickel strike film,

D. placing the nickel strike coated copper substrate in a nickel containing bath selected from the group consisting of nickel sulfamate solution and nickel sulfate solution, making the substrate a cathode, and electrocoating the substrate with a pin hole free nickel film having a thickness of between about 2.5 microns to about 12.5 microns, said film being effective to prevent copper ion diffusion,

E. single step, non-aqueous electrocoating the microsmoothed, nickel coated substrate with a pin hole free polyamic acid polymer film from a composition comprising a polyamic acid polymer, a nitrogen containing base which reacts with the acid to form a salt, and a dual liquid system consisting of a liquid, organic, non-aqueous solvent for the acid and a liquid, non-aqueous, non-solvent for the salt of the acid, and

F. curing the polyamic acid coating to form a polyimide film free of copper ion deposits.

14. A wound copper coil coated by the method of claim 9.

4,019,878

ADDITIVE COMBINATION FOR COLD FLOW IMPROVEMENT OF MIDDLE DISTILLATE FUEL OIL

Max J. Wisotsky, Highland Park, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 17, 1974, Ser. No. 533,513

Int. Cl.² C10L *1/20*

U.S. Cl. 44—62 11 Claims

1. A distillate fuel oil improved in its cold flow characteristics comprising a major proportion of an atmospheric distillate petroleum oil having a cloud point of at least about −15° C., and a synergistic flow improving combination in the range of about 0.005 to 3 wt.% of:

A 0.3 to 10 parts by weight of an oil soluble ethylene-containing polymeric pour point depressant having a number average molecular weight in the range of about 500 to 50,000, and selected from the group consisting of:

1. branched polyethylene;
2. ethylene polymer chlorinated to contain about 5 to 35 wt.% chlorine;
3. copolymers of 3 to 40 molar proportions of ethylene with a C_3 to C_{16} alpha monoolefin, or a monoethylenically unsaturated mono- or diester of the general formula:

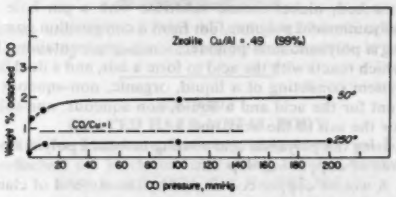
wherein R_1 is hydrogen or methyl; R_2 is a $-OOCR_4$ or $-COOR_4$ group wherein R_4 is hydrogen or a C_1 to C_{16} alkyl group; and R_3 is hydrogen or $-COOR_4$;

per part by weight of coadditive selected from the group consisting of (B) beeswax, (C) ozokerite wax and (D) a mixture of alpha-monoolefins having at least 24 carbon atoms up to about 50 carbon atoms, wherein a major proportion by weight of said olefin mixture is C_{30} and higher olefins.

4,019,879
SELECTIVE ADSORPTION OF CARBON MONOXIDE FROM GAS STREAMS

Jule Anthony Rabo, Armonk; James Nelson Francis, Peekskill, and Charles Leslie Angell, Pleasantville, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Sept. 26, 1975, Ser. No. 617,084
Int. Cl.² B01D *53/04*
U.S. Cl. 55—68 6 Claims



1. Process for removing carbon monoxide from a gas stream comprising at least 10 ppm CO by volume and at least one other constituent selected from the group consisting of H_2O and CO_2 which process comprises passing said gas stream at a temperature of from 0 to 300° C. through an adsorbent mass of a crystalline zeolitic molecular sieve having a framework SiO_2/Al_2O_3 molar ratio of from 20 to 200 and having as zeolite constituents monovalent copper cations, whereby CO molecules are adsorbed and a CO-depleted effluent gas stream is obtained.

4,019,880
ADSORPTION OF CARBON MONOXIDE USING SILVER ZEOLITES

Jule Anthony Rabo, Armonk; James Nelson Francis, Peekskill, and Charles Leslie Angell, Pleasantville, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 617,082, Sept. 26, 1975, abandoned.
This application Aug. 10, 1976, Ser. No. 713,034
Int. Cl.² B01D *53/34*
U.S. Cl. 55—68 4 Claims

1. Process for removing carbon monoxide from a gas stream comprising at least 10 ppm CO by volume and at least one other constituent selected from the group consisting of H_2O and CO_2 which comprises passing said gas stream at a temperature of from 0 to 300° C. through an adsorbent mass of a crystalline zeolitic molecular sieve having a framework SiO_2/Al_2O_3 molar ratio of from 20 to 200 and having as zeolitic constituents silver cations, whereby CO molecules are adsorbed and a CO-depleted effluent gas stream is obtained.

4,019,881
MOISTURE SEPARATOR FOR A NUCLEAR STEAM TURBINE

Josef Herzog, Scotia, N.Y.; Kenneth K. Woods, Cape Elizabeth, Maine, and William S. Hubble, Gulfport, Miss., assignors to General Electric Company, Schenectady, N.Y.

Filed June 3, 1975, Ser. No. 583,354
Int. Cl.² B01D *19/00*
U.S. Cl. 55—185 13 Claims

1. A moisture separator comprising:

a. a vessel sealed at both ends and having a generally horizontal axis,

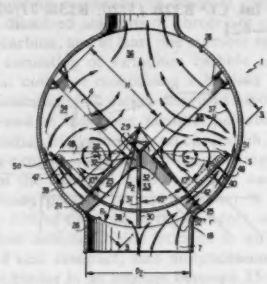
b. a plurality of axially displaced wet steam inlets disposed below said horizontal axis,

c. a plurality of dry steam outlets disposed above said horizontal axis,

d. a plurality of inertial-type moisture separator elements disposed in axially extending banks between said wet steam inlets and said dry steam outlets,

e. a drain trough below said moisture separator elements for collecting condensate and directing it to a hot well,

f. a plurality of support means axially displaced along the length of said vessel for supporting said drain trough and said moisture separator elements,



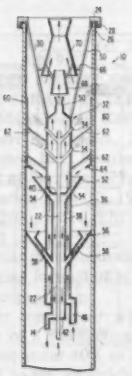
g. an impingement baffle for each of said wet steam inlets, each impingement baffle being disposed between its respective wet steam inlet and said moisture separator elements, and

h. each of the ends of said impingement baffles being spaced from the inner surface of said vessel by a distance such that a vortex is imparted to the steam to effect more even distribution of steam to said moisture separator elements and to assist in the removal of condensate from said moisture separator elements.

4,019,882
STACK GAS CLARIFIER

Andres Herrera, 12166 Loiza Station, Santurce, P.R. 00914

Filed Feb. 5, 1976, Ser. No. 655,357
Int. Cl.² B01D *47/06*
U.S. Cl. 55—220 7 Claims



1. Stack gas clarifying apparatus for mounting within and to remove particulate and soluble gaseous pollutants from stack gases passing upwardly through an upstanding smokestack comprising a wall portion having an outer periphery and an inner portion having an inner surface of a given inner diameter and within which stack gases may pass from the base portion to the top portion thereof, said stack gas clarifying apparatus including support means engageable with the top portion of and for supporting said apparatus within a smokestack with which said apparatus is to be used; a plurality of arms mounted

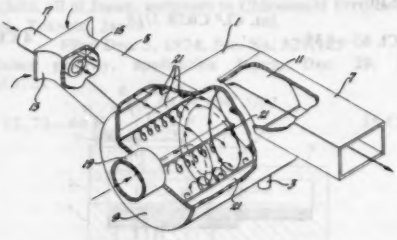
on and projecting downwardly and inwardly from said support means; a scrubber assembly mounted on said arms and including first and second concentric conduits rigidly joined together and mounted on said arms in position to extend in substantially coaxial relation with a smokestack within which said apparatus is to be supported by said support means; inlet means for directing gas under pressure into said first concentric conduit; outlet means operatively connected to the lower end portion of said second conduit; a plurality of annular, upwardly open fluid collecting troughs extending around said concentric conduits in vertically spaced relation to one another; drain means providing fluid communication between said troughs and said second conduit; gas discharge means on the top end portion of said first conduit for directing a stream of gas under pressure upwardly above said concentric conduits and through the interior portion of a smokestack within which said apparatus is to be supported by said support means; a plurality of liquid spray nozzles mounted above said trough means in a position to discharge liquid under pressure in an upwardly inclined direction within a smokestack within which said apparatus is to be used; and a third conduit operatively connected to said nozzles for supplying a scrubbing liquid thereto.

4,019,883

VORTEX SULFURIC ACID SEPARATOR

Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 2, 1975, Ser. No. 582,776
Int. Cl.² B01D *51/00*
U.S. Cl. 55—264 **3 Claims**



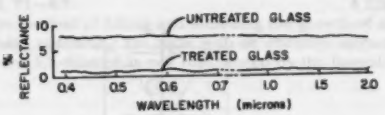
1. A device in combination with an exhaust tube for removing sulfuric acid from a hot exhaust gas stream which flows through said exhaust tube comprising a substantially cylindrical body member having a gas inlet means at one end and a gas outlet at the other end, both said inlet means and said outlet being arranged tangent to the cylinder inner wall surface to form a vortical flow path through said cylinder between said ends, said inlet means having an open inlet end which is positioned with respect to said exhaust tube such as to receive the exhaust gas stream for treatment, and for supplying cooling air to said gas inlet end, a plurality of means provided on said inner wall surface and projecting therefrom into the vortical flow path to create turbulent flow in said gas stream to enable a maximum surface contact and intermixture of the air and exhaust gas and maximum mass transfer to said surface, and a drain provided in said body member through which condensed sulfuric acid may be removed, said inner wall surface being at a temperature below the condensation temperature of the sulfuric acid in the exhaust gas stream, molecular transport and the turbulent mixing of the gases tending to maintain the acid concentration constant across any radial section through the body member to thus cause a flow of acid molecules and very small droplets toward the cool inner wall surface at which the acid concentration in the gases is the least.

4,019,884

METHOD FOR PROVIDING POROUS BROAD-BAND ANTIREFLECTIVE SURFACE LAYERS ON CHEMICALLY-DURABLE BOROSILICATE GLASSES

Thomas H. Elmer, Corning, and Helen Walters, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Jan. 22, 1976, Ser. No. 651,429
Int. Cl.² C03C *15/00*
U.S. Cl. 65—30 R **6 Claims**



1. A process for providing a glass article having a porous broad-band antireflective surface layer exhibiting a reflectance not exceeding about 2% at all wavelengths in the 0.4–2.0 micron range consisting of the steps of:

a. selecting a borosilicate glass article composed of a glass having an oxide composition, in weight percent, of about 72–82% SiO_2, 13–16% B_2O_3, 3–10% total of alkali metal oxides selected from the group consisting of Na_2O, K_2O and Li_2O, and 0–4% Al_2O_3, these oxides making up at least about 93% by weight of the glass;

b. heating the borosilicate glass article to a temperature in the range of 630°–660° C. for a time in the range of about 1–10 hours to develop phase separation therein and producing a non porous surface; and thereafter

c. contacting the nonporous surface of the borosilicate glass article with an aqueous treating solution containing both hydrogen and fluoride ions, said solution having a hydrogen ion normality of at least about 0.02 gram equivalents per liter and a fluoride ion normality of at least about 0.02 gram equivalents per liter, for a time at least sufficient to produce a porous antireflective surface layer on said article.

4,019,885

REMOVING METAL DEPOSITS FROM THE SUPERSTRUCTURE OF A FLOAT GLASS CHAMBER

Richard R. Snow, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Feb. 13, 1976, Ser. No. 657,928
Int. Cl.² C03B *18/02*
U.S. Cl. 65—32 **16 Claims**

1. A method of removing metal deposits from the superstructure of a float chamber having a non-oxidizing atmosphere over a bath of molten metal, wherein a portion of said molten metal has evaporated from said bath and condensed on said superstructure, comprising the steps of:

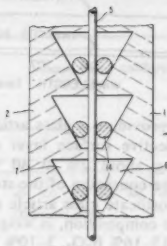
a. introducing a fluxing agent selected from the group consisting of halogens, haldies and mixtures thereof, into said non-oxidizing atmosphere; and

b. permitting said fluxing agent to travel along said superstructure with the natural flow of said non-oxidizing atmosphere so that said metal deposits condensed on said superstructure and contacted by said fluxing agent coalesce and drop from said superstructure.

4,019,886
METHOD OF MANUFACTURE OF MULTIPLE GLASS NOZZLE ARRAYS

Arthur Rowland Hoffman, Longmont, Colo.; Arthur Harry Kendall, Franklin Lakes, N.J., and Robert Lewis Rohr, Scarsdale, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 12, 1975, Ser. No. 640,138
Int. Cl.² C03B *23/20*
U.S. Cl. 65—43 **15 Claims**



1. A method of manufacturing multiple nozzle arrays for use in ink jet recording apparatus comprising

forming an assembly of two plates having intersecting channels therebetween which carry orifice elements and sealing material in which the sealing material has a lower melting point than said orifice elements and said plates;

placing said assembly on a support so that said orifice elements are positioned with a downward inclination and said sealing material in each intersecting channel is in contact with a portion of each said orifice element above the area to be sealed;

entering said assembly into a furnace having appropriate controls for temperature regulation;

heating said assembly in a manner to cause only said sealing material to melt and to flow by capillary and gravity action to seal said orifice elements and said plates;

cooling said assembly gradually from the set point temperature of said sealing material to room temperature;

slicing said assembly into a plurality of multiple nozzle wafers.

4,019,887
METHOD FOR COATING GLASS

Bernard James Kirkbride, Wigan; Robert Andrew Downey, Burscough; Charles Victor Thomasson, Preston, and Joseph Earle Lewis, Burscough, all of England, assignors to Pilkington Brothers Limited, St. Helens, England

Filed June 10, 1975, Ser. No. 585,522
Claims priority, application United Kingdom, June 14, 1974, 26522/74
Int. Cl.² C03C *17/20*
U.S. Cl. 65—60 C **10 Claims**

1. A method of producing a silicon coating on a glass surface, comprising:

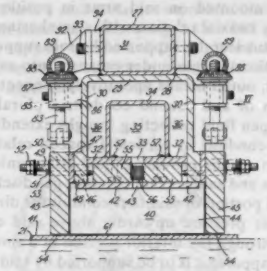
moving the glass surface at a temperature of at least 400° C past a hot zone of a coating station, which hot zone extends across the glass surface and opens towards the glass surface;

maintaining non-oxidising conditions in the hot zone;

supplying silane-containing gas to the coating station and feeding the gas to said hot zone;

cooling the silane-containing gas at the coating station as it is fed towards said hot zone; and

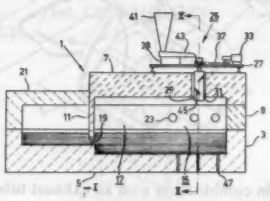
releasing the cool silane-containing gas into the hot zone at a substantially constant pressure across that zone so that the gas is rapidly heated as it traverses the hot zone and reaches the glass surface at a substantially constant temperature and pressure across the glass surface for pyrolysis thereon to produce a silicon coating of predetermined thickness on the glass surface.



4,019,888
METHOD OF MELTING A RAW BATH AND A GLASS FURNACE FOR PERFORMING THE METHOD

Paulus Jozef Maria Verhappen; Antonius Johannes Maria Van Tienen; Johannes Feenstra, and Petrus Theodorus Cornelis Bastings, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,577
Claims priority, application Netherlands, Feb. 10, 1975, 7501530
Int. Cl.² C03B *5/18*
U.S. Cl. 65—135 **4 Claims**



1. A method of melting a raw batch in a glass melt having a melting zone and a fining zone, the raw batch being continuously fed into the melting zone for melting, comprising the steps of supplying heat to the melting zone, supplying raw batch in the form of prepared particles at a controlled rate, uniformly scattering said particles in a layer over the surface of molten glass in the melting zone, controlling the rate of supplying said raw batch and said heat so that said layer is a monolayer, and injecting a gas into the molten glass below said layer at a rate sufficient to puncture any foam blanket tending to form on the molten glass.

3. An apparatus for melting and fining glass, comprising a melting tank having a melting compartment having a roof thereover and a bottom, a fining compartment, means for firing the tank, means for communicating with a forehearth, and a charging device mounted over the melting compartment, wherein said roof has an opening, and said charging device comprises a rotor having distributing vanes mounted in said roof opening at a height remote from the surface of the melt and adapted for spreading prepared particles in a single layer over the surface of the melt, and said melting compartment comprises a gas inlet tube in said bottom.

4,019,889

SLOW ACTING FERTILIZER

Joseph P. Kealy, Winterhaven, Fla., assignor to Swift Chemical Company, Chicago, Ill.

Division of Ser. No. 360,099, May 14, 1973, Pat. No. 3,925,053. This application July 21, 1975, Ser. No. 597,322
Int. Cl.² C05C 9/00
U.S. Cl. 71—29 7 Claims

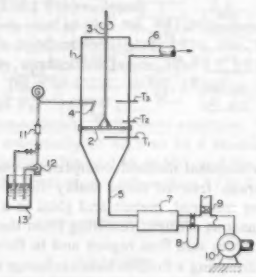
1. A method for producing granular pellets of about 2 mm to about 25 mm having slow release characteristics and particularly useful for garden line plants which comprises charging plant food containing isobutylidene diurea and vitreous masses of P_2O_5 into a mixer, steaming the plant food to a temperature of about 140° F. to 210° F. so as to give a moisture content of between about 2% and about 8%, charging calcium sulfate hemihydrate into the mixer in an amount such that the ultimate pellets contain about 10–50%, by weight, of hydrated calcium sulfate and about 90–50%, by weight, of plant food, adding hot water to the charged mixture in an amount sufficient for crystallization of the calcium sulfate, forming a granuable mixture and subsequently drying the granules.

4,019,890

METHOD FOR PRODUCING COATED FERTILIZER

Toshio Fujita; Chigo Takahashi; Masanari Ohshima, all of Fujishi; Tsunezo Ushioda, Tokyoto, and Hirozo Shimizu, Fujishi, all of Japan, assignors to Chissoasahi Fertilizer Co., Ltd., Tokyoto, Japan

Filed Dec. 3, 1974, Ser. No. 529,125
Claims priority, application Japan, Dec. 28, 1973, 49-144724
Int. Cl.² C05C 5/02
U.S. Cl. 71—64 F 15 Claims



1. A method for producing slow-releasing granular fertilizer fully coated with water-resisting, transparent, lustrous layer of resin in such a manner that the coated granules do not stick together, which comprises spraying a solution having a viscosity of 40 C.P. or less at close to its boiling point of a thermoplastic resin in a hydrocarbon or chlorinated hydrocarbon solvent, upon fertilizer granules, and drying said fertilizer granules upon being sprayed with said solution, continuously and immediately on the spout with hot, dry air at an air speed of at least 15m/sec., said solution having the property capable of forming a solution while it is hot but turning into jelly-like gel when it is cooled and said granules being at a temperature of 40°–90° C during the drying and spraying steps.

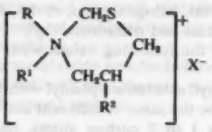
4,019,891

PROCESS FOR CONTROLLING ALGAE WITH TETRAHYDRO-1,3-THIAZINIUM SALTS

Ludwig Konrad Huber, King of Prussia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 584,330, June 6, 1975, Pat. No. 3,966,929, which is a division of Ser. No. 461,556, April 17, 1974, Pat. No. 3,919,422, which is a division of Ser. No. 220,372, Jan. 24, 1972, Pat. No. 3,821,210. This application Apr. 8, 1976, Ser. No. 675,046
Int. Cl.² A01N 9/12
U.S. Cl. 71—67 4 Claims

1. The method of killing and inhibiting the growth of algae comprising contacting the algae with an effective amount of tetrahydro-1,3-thiazinium salt represented by the formula



where X is an anion selected from the group consisting of chloride, bromide, iodide, acetate, formate, perchlorate and tosylate, R^2 is hydrogen or hydroxyl, and R and R^1 are independently alkyl having one to 20 carbon atoms or alkyl having one to 20 carbon atoms substituted with one or two hydroxyl groups, the total of the number of carbon atoms in $R + R^1$ being from about 12 to 24.

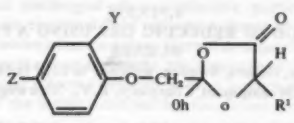
4,019,892

HERBICIDAL HETEROCYCLIC COMPOUNDS

Kurt H. G. Pilgram, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 31, 1975, Ser. No. 645,598
Int. Cl.² C07D 317/34
U.S. Cl. 71—88 9 Claims

1. A compound of the formula



wherein Y is halogen or alkyl of 1 to 6 carbon atoms; Z is halogen and R^1 is hydrogen or alkyl of 1 to 6 carbon atoms.

8. A method for controlling undesirable plant growth which comprises applying to the locus to be protected a herbicidally effective amount of a compound as claimed in claim 1 or a composition thereof.

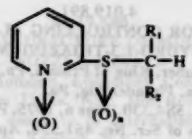
4,019,893

HERBICIDAL METHOD USING 2-SULFINYL OR 2-SULFONYL PYRIDINE N-OXIDE DERIVATIVES

Howard L. Plant, Milford, and Allyn Roy Bell, Cheshire, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 559,188
Int. Cl.² A01N 9/22
U.S. Cl. 71—94 17 Claims

1. A method of controlling weeds comprising applying, to a locus at which it is desired to control weeds, a herbicidally effective amount of a 2-sulfinyl or 2-sulfonyl pyridine N-oxide compound of the formula:



where

n is 1 or 2;

R_1 is hydrogen, alkyl having 1 to 3 carbon atoms or phenyl;

R_2 has one of the following values when R_1 is hydrogen:

benzyl, styryl, naphthyl, methylnaphthyl, phenyl, substituted phenyl with 1 to 5 substituents which may be the same or different and are selected from alkyl having 1 to 3 carbon atoms, halogen, nitro, cyano, alkoxy having 1 to 2 carbon atoms and trifluoromethyl;

R_2 has one of the following values when R_1 is other than hydrogen:

naphthyl, phenyl, substituted phenyl with 1 to 3 substituents which may be the same or different and are selected from alkyl having 1 to 2 carbon atoms, halogen, nitro, and methyl sulfonyl.

4,019,894

PLANT GROWTH REGULATING AGENT

Christian Vogel, Binningen, and Rudolph Aebi, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 548,042, Feb. 7, 1975, Pat. No. 3,952,056, and a continuation-in-part of Ser. No. 328,202, Jan. 31, 1973, abandoned. This application Jan. 29, 1976, Ser. No. 653,556

Claims priority, application Switzerland, Feb. 7, 1972, 1739/72; May 16, 1972, 7283/72

Int. Cl.² A01N *9/20*

U.S. Cl. 71—118 **3 Claims**

1. A herbicidal composition containing as active substance a herbicidally effective amount of the compound 2-chloro-2′,6′-dimethyl-N-(1-methoxyprop-2-yl)-acetanilide, together with a suitable carrier.

4,019,895

METHOD OF REDUCING ORE USING A PLASMA BURNER

Sven Santen, Hofors, Sweden, assignor to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

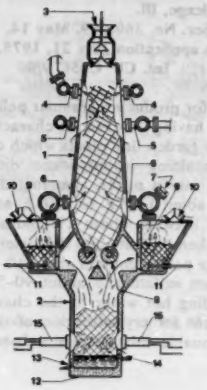
Filed Feb. 10, 1975, Ser. No. 548,743

Claims priority, application Sweden, Feb. 20, 1974, 7402210

Int. Cl.² C21C *5/52*,

U.S. Cl. 75—11 **6 Claims**

1. In a method of reducing iron ore, the steps comprising: providing first and second furnaces, feeding said ore into said first furnace, flowing reduction gas from said second furnace into said first furnace, partially reducing said ore in said first furnace with said reduction gas, preheating said ore in said first furnace by burning at least some of said reduction gas therein, feeding into said second furnace a charge comprising a solid carbon reducing agent in lump form, and said partially-reduced ore from said first furnace, said charge forming a permeable mixture, supplying heat energy to a gas and flowing said heated gas into said second furnace through said charge therein and thereby heating said charge by heat exchange therewith, and in said second furnace finally reducing and melting said partially-reduced ore from said first furnace in the presence of said solid carbon reducing agent, and thereby producing at least a portion of said reduction gas subsequently fed into said first furnace, and flowing said reduction gas from said second furnace into heat exchange with and thereby preheating said solid carbon reducing agent and reducing said reduction gas temperature before said reducing agent is fed



into said second furnace, this preheated reduction gas being said reduction gas flowed into said first furnace from said second furnace.

4,019,896

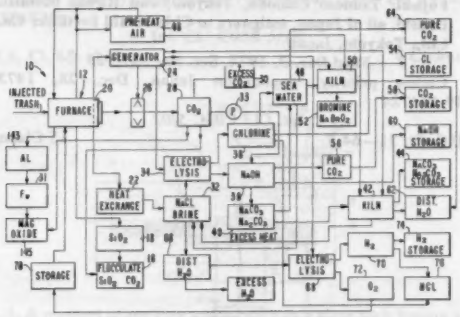
TRASH DISPOSAL SYSTEM

Vernon L. Appleby, 1720 W. Bayshore, No. 19, Palo Alto, Calif. 94303

Continuation-in-part of Ser. No. 300,632, Oct. 25, 1972, abandoned. This application July 3, 1975, Ser. No. 593,150

Int. Cl.² C21B *15/00*

U.S. Cl. 75—44 S **11 Claims**



1. A trash disposal method comprising: burning a mass of pulverized trash free of large bulky items and containing carbonaceous material, metals and glass in a first region and allowing a gaseous effluent resulting from the burning of said trash to exit from said first region and to flow through a second region; directing a fluid in heat exchange relationship with said first region for heating the fluid to thereby increase the energy content thereof; generating electrical power as a function of the energy content of the fluid; applying a portion of said electrical power across said second region to generate an electrical arc and to subject the effluent thereto, whereby any carbonaceous particle matter in the effluent will be vaporized and converted to carbon dioxide; electrolyzing a mass of seawater to form a mass of chlorine and a mass of sodium hydroxide; storing the chlorine and sodium hydroxide masses in third and fourth regions, respectively; directing a portion of the carbon dioxide from the effluent to said fourth region to form at least one of a mass of sodium carbonate and a mass of sodium bicarbonate; and storing said masses of sodium carbonate and sodium bicarbonate in a fifth region.

4,019,897

DESULFURIZING AND INOCULATING AGENT FOR MOLTEN IRON

Hiroshi Yoshida, Kasukabe, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan

Filed Sept. 8, 1975, Ser. No. 611,084
Claims priority, application Japan, Aug. 13, 1975, 50-97671
Int. Cl.[2] C21C 7/02
U.S. Cl. 75—58 4 Claims

1. A magnesium base molding for the treatment of molten iron comprising 1 to 20% by weight of refractory fibrous material; 0.1 to 10% by weight of organic fibrous material; in excess of 1.2% by weight magnesium particles, said magnesium particles having a diameter of less than about 10 mm; and 0.1 to 10% by weight of binder.

4,019,898

BENEFICIATION OF ILMENITE ORE

James H. Chen, and Lewis W. Huntoon, both of Corpus Christi, Tex., assignors to Benilite Corporation of America, New York, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,099
Int. Cl.[2] C22B 1/00, 34/12
U.S. Cl. 75—101 R 8 Claims

1. In a process for the beneficiation of ilmenite ore wherein the ilmenite ore is leached with a hydrochloric acid leach liquor to provide a mother liquor containing acid-soluble iron contaminant values and acid-insoluble titanium values and these values are subsequently separated from one another to yield a solid beneficiated ilmenite product, the improvement which comprises leaching the ilmenite ore with a stoichiometric excess of the hydrochloric acid leach liquor containing added sulfate ion in a small amount of from about 0.5% to about 2.5% of the weight of the ilmenite ore, whereby fines or slime formation in the mother liquor is minimized and the color of the solid beneficiated ilmenite product is lighter.

4,019,899

EROSION-RESISTANT MATERIALS

Akira Negishi; Kiyoshi Takayanagi; Masaru Ikeda, and Shinji Kousaka, all of Tokyo, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 151,068, June 8, 1971, abandoned. This application Aug. 1, 1974, Ser. No. 493,846
Claims priority, application Japan, June 11, 1970, 45-50454
Int. Cl.[2] C22C 14/00, 19/02
U.S. Cl. 75—134 F 3 Claims

1. An erosion-resistant and wear-resistant Ti-Ni-M_1-M_2 alloy consisting essentially of 42.5 to 54.4 atomic percent of Ti, in which M_1 is Ta or Nb and M_2 is Mo, and the atomic ratio of $M_1 + M_2$ to the total atoms other than Ti is 1 to 55%.

4,019,900

HIGH STRENGTH OXIDATION RESISTANT NICKEL BASE ALLOYS

Mathur Raghavan, and Eugene Shapiro, both of Hamden, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Apr. 1, 1976, Ser. No. 672,664
Int. Cl.[2] C22C 19/05
U.S. Cl. 75—171 12 Claims

1. A nickel base alloy having high resistance to oxidation at elevated temperatures, good hot workability, good creep resistance, good high temperature mechanical properties and high creep rupture strength, said alloy consisting essentially of from 2 to 6% by weight aluminum, 1 to 6% by weight chromium, 0.5 to 4% by weight silicon, 5 to 20% by weight cobalt, 0.03 to 0.30% by weight carbon, 0.005 to 0.25% by weight magnesium, balance nickel.

4,019,901

ULTRA-HIGH STRENGTH STEEL HAVING IMPROVED RESISTANCE TO ENVIRONMENTAL STRESS CORROSION CRACKING

Herbert E. Townsend, Jr., Allentown; James B. Horton, Bethlehem, and Louis R. Woodyatt, Whitehall, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Division of Ser. No. 371,195, June 18, 1973, Pat. No. 3,966,421. This application May 10, 1976, Ser. No. 685,019
Int. Cl.[2] B22F 3/16; C22C 1/05
U.S. Cl. 75—206 2 Claims

1. In a process for producing a powder metallurgy article of manufacture having a dispersion of a metal oxide in a ferrous metal matrix including in order the steps of mixing a metal oxide powder, a ferrous metal powder, zinc stearate, and natural graphite to form a mixture, forming a compact from said mixture, heating said compact, sintering said compact, hot working said compact, and heat treating said compact, the improvement comprising:

a. calcining said metal oxide powder before said metal oxide powder is mixed with said ferrous metal powder, zinc stearate, and natural graphite.

4,019,902

PHOTORECEPTOR FABRICATION

Lewis B. Leder, Rochester; John C. Schottmiller, Penfield, and Harold H. Schroeder, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 477,736, June 10, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 605,136
Int. Cl.[2] G03G 5/04
U.S. Cl. 96—1.5 13 Claims

1. A method for obtaining flexible photoreceptors having improved durability and adhesion between components thereof and containing a metal- or metal-coated substrate and a photoconductive layer of an ionizable inorganic photoconductive material in good charge blocking contact with the substrate, comprising initially bombarding the substrate, as cathode, under partial vacuum, with positive ions of a non-metallic gas under glow discharge in the presence of air or a mixture of oxygen with at least one inert ion-forming gas; and exposing the resulting oxidized substrate to a vapor cloud of photoconductive material consisting essentially of both charged and uncharged photoconductive particles in and adjacent to an electrical field utilizing a donor of said photoconductive material or container thereof or adjacent structure and the substrate as an electrode, the exposure of the oxidized substrate being effected separately or in conjunction with at least part of the initial substrate bombardment step.

4,019,903

ELECTROSTATIC DEVELOPMENT

Robert J. Hagenbach, Rochester, N.Y., and Robert D. Fenity, deceased, late of Webster, N.Y. (by Nancy Fenity, executrix), assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 104,498, Jan. 6, 1971, abandoned. This application Oct. 26, 1973, Ser. No. 409,993
Int. Cl.[2] G03G 9/02, 13/08
U.S. Cl. 96—1 SD 11 Claims

1. A process for providing a visible image from a latent electrostatic image, comprising:

passing over an electrostatic latent image-bearing surface an electrostatographic developer composition consisting of a toner material electrostatically clinging to an uncoated carrier having an average diameter of from between about 30 and about 1,000 microns, said carrier consisting of a material containing at least one member selected from the group consisting of crystalline double oxides of a member selected from the group consisting of titanium, hafnium, zirconium, tin and germanium and at least one member selected from the group consisting of alkaline earths and lead, whereby said toner material is

attracted to said surface to render said latent image visible.

4,019,904

PLANOGRAPHIC PRINTING PLATES AND A METHOD OF PREPARING THEM USING PHOTOPOLYMERIZABLE ORGANOPOLYSILOXANES WITH MALEIMIDO GROUPS

Atsumi Noshiro, Chiba; Minoru Takamizawa, Annaka; Yasushi Yamamoto, Annaka; Yoshio Inoue, Annaka, and Hitoshi Fujii, Tokyo, all of Japan, assignors to Dai Nippon Printing Company Limited and Shin-Etsu Chemical Company Limited, both of Tokyo, Japan

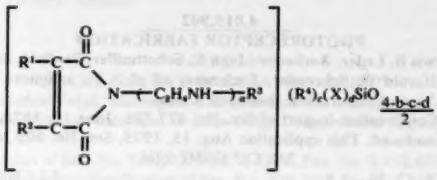
Filed Mar. 30, 1976, Ser. No. 671,737

Claims priority, application Japan, Apr. 14, 1975, 50-4969

Int. Cl.² G03F *7/02*; G03C *1/68*

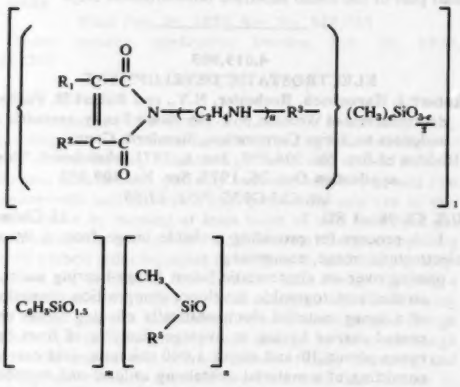
U.S. Cl. 96—33 **23 Claims**

1. A planographic printing plate comprising a base having ink-receptive areas and ink-repellent areas thereon, wherein said ink-repellent areas are covered by a cured and hardened layer of a photopolymerizable organosilicon compound represented by the average unit formula



where R^1 is a monovalent aromatic group or a monovalent heterocyclic group, R^2 is an atom or a group selected from the class consisting of a hydrogen atom, a halogen atom, a cyano group and a monovalent hydrocarbon group with 1 to 4 carbon atoms, R^3 is a divalent hydrocarbon group with 1 to 10 carbon atoms, R^4 is a monovalent hydrocarbon group, X is a hydroxy group or a hydrolyzable group, a is 0 or 1, and b, c and d each are numbers expressed by $0<b \leq 1$, $0 \leq c \leq 3$ and $0 \leq d \leq 3$, respectively, with the proviso that $0<b+c+d \leq 4$.

2. A planographic printing plate comprising a base having ink-receptive areas and ink-repellent areas thereon, wherein said ink-repellent areas are covered by a cured and hardened layer of a photopolymerizable organopolysiloxane represented by the average unit formula



wherein R^1 is a monovalent aromatic group or a monovalent heterocyclic group, R^2 is an atom or a group selected from the class consisting of a hydrogen atom, a halogen atom, a cyano group and a monovalent hydrocarbon group with 1 to 4 carbon atoms, R^3 is a divalent hydrocarbon group with 1 to 10 carbon atoms, R^5 is a methyl group or a 3,3,3-trifluoropropyl group, a is 0 or 1, e is 0 or 1, n is a positive number not less than 25, and l and m each are positive numbers with the proviso that n/l is from 25 to 2,000 and n/m is from 2.5 to 50.

4,019,905

METHOD FOR FORMING FLUORESCENT SCREEN OF COLOR CATHODE RAY TUBES USING FILTER LAYER

Yoshifumi Tomita; Kiyoshi Miura, and Hiromitu Nakai, all of Mobara, Japan, assignors to Hitachi, Ltd., Japan

Filed June 17, 1975, Ser. No. 587,664

Claims priority, application Japan, June 17, 1974, 49-68195

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36.1 **16 Claims**

1. A method for preparing a plurality of screen elements on a faceplate panel of a color cathode ray tube having a color selecting mask, said method comprises the steps of:

coating a filter layer being responsive to only a first actinic radiation on a faceplate panel of the tube, said filter layer including an organic vehicle and an organic filter material that is turned into a transparent state to a second actinic radiation by exposing to a first actinic radiation;

overcoating a photosensitive screening layer on said filter layer,

forwardly exposing said filter layer through a color selecting mask to the first actinic radiation for turning the exposed portions of the filter layer into a transparent state and for turning the exposed portion of the photosensitive layer into a water-insoluble state cooperating with exposing to the second actinic radiation,

backwardly exposing said photosensitive screening layer through the panel and said filter layer of forward exposed portions to the second actinic radiation to which the photosensitive screening layer is responsive, and

developing said screen to remove unsaturated exposed portions of the photosensitive screening layer, and to provide said screen elements thereon.

4,019,906

CURTAIN COATING METHOD

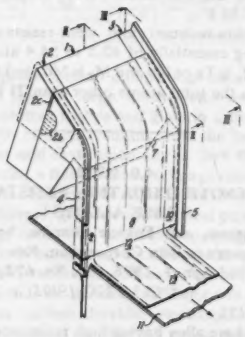
Kenneth Arthur Ridley, Ilford, England, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed Oct. 11, 1974, Ser. No. 514,255

Claims priority, application United Kingdom, Oct. 12, 1973, 47671/73

Int. Cl.² B05D *1/30*; G03C *3/00*

U.S. Cl. 96—68 **3 Claims**



1. A method of coating a travelling web with at least two layers of a liquid photographic coating composition, said method comprising:

moving a web to be coated along a path through a coating zone; and

forming at said coating zone a free-falling vertical curtain

which extends transversely of said path and impinging said curtain on said travelling web to deposit thereon a photographic coating, said step of forming comprising providing said free-falling curtain composed of three separately formed free-falling partial curtains which are integrally joined edge-to-edge to form an integral curtain wider than the width of said web to be coated, a first and a second of said partial curtains constituting edge regions of the integral curtain, and the third partial curtain constituting a central region of said integral curtain, said third partial curtain being narrower than the width of said web to be coated and consisting of at least two juxtaposed laminae of coating liquid, and said first and second partial curtains each being formed to consist of a single lamina of liquid which is different from the liquids forming said third partial curtain, but which with respect to the rheological properties thereof is compatible therewith.

4,019,907

PHOTOSENSITIVE AZIDO COLOR-FORMING ELEMENT

Takahiro Tsunoda, Funabashi; Minoru Ozutsumi, Tokyo; Shigeo Maeda, Tokyo; Susumu Suzuka, Tokyo; Hidetoshi Komiya, Tokyo, and Hideaki Shinohara, Tokyo, all of Japan, assignors to Hodogaya Chemical Co., Ltd. and Oji Paper Co., Ltd., both of Tokyo, Japan

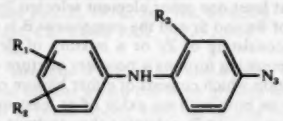
Filed Oct. 17, 1974, Ser. No. 515,571

Claims priority, application Japan, Oct. 24, 1973, 48-119543; July 8, 1974, 49-77407

Int. Cl.² G03F *7/08*; G03C *1/52*

U.S. Cl. 96—75 **12 Claims**

1. A photosensitive color forming element comprising a support and a photosensitive color-forming layer coated on said support and containing therein at least one photosensitive color forming azido compound of the formula (I):



wherein R_1 and R_2 respectively represent a substituent selected from the group consisting of hydrogen and halogen atoms and alkyl, alkoxyl, dialkylamino, acylamino, and hydroxyl radicals, and are respectively in 2 - and 4 - positions, 3 - and 5 - positions or 2 - and 5 - positions of said benzene ring with respect to said -NH- group of said benzene ring, and R_3 represents an alkylcarboxyl radical.

4,019,908

SILVER HALIDE PHOTOGRAPHIC MATERIAL

Peter John Wright, Ilford, England, assignor to Ilford Limited, England

Filed Nov. 6, 1973, Ser. No. 413,202

Claims priority, application United Kingdom, Nov. 22, 1972, 53869/72

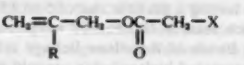
Int. Cl.² G03C *1/72*, *1/68*

U.S. Cl. 96—114 **7 Claims**

1. A silver halide photographic element comprising a photobase having coated thereon at least one colloid layer which comprises gelatin and a film forming copolymer derived from:

I. a monomer mixture comprising vinyl acetate and at least one other monomer copolymerisable therewith, said mixture of monomers being selected such that the glass transition temperature of the copolymer of vinyl acetate and the other monomer or monomers is below 20° C, and

II. an allyl or methallyl monomer of the formula



where R is a hydrogen atom or a methyl group and

X is an aliphatic acyl group or a cyano group, the proportion of component II being 1–20% by weight based on the total weight of components I and II.

4,019,909

PHOTOHARDENABLE VESICULAR IMAGE-FORMING ELEMENTS

Abraham Bernard Cohen, Springfield, and Leo Roos, New Shrewsbury, both of N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 11,887, Feb. 16, 1970, abandoned. This application June 21, 1972, Ser. No. 264,951

Int. Cl.² G03C *1/68*

U.S. Cl. 96—115 P **9 Claims**

1. An element comprising a support bearing at least one solid photohardenable layer that softens at 40° to 220° C. and is capable of forming a positive vesicular image, said layer comprising (a) about 60 to 99% by weight of at least one thermoplastic ethylenically unsaturated photohardenable material and (b) in admixture with said photohardenable material, about 1 to 40% by weight of a blowing agent which, when heated to at least 75° C., produces gas bubbles in areas of said layer which are not photohardened, said blowing agent being stable to actinic radiation by which said photohardenable material is photohardened.

4,019,910

ELECTROLESS NICKEL POLYALLOY PLATING BATHS

Glenn O. Mallory, Jr., Inglewood, Calif., assignor to The Richardson Chemical Company, Des Plaines, Ill.

Filed May 24, 1974, Ser. No. 473,147

Int. Cl.² C23C *3/02*

U.S. Cl. 106—1 **38 Claims**

1. An aqueous plating bath for electrolessly depositing a polymetallic nickel alloy containing nickel, an element selected from boron or phosphorus and a metal selected from the group consisting of tin, tungsten, molybdenum or copper, such bath comprising a source of nickel metal cation and a source of at least one metal cation selected from the group consisting of tin, tungsten, molybdenum and copper, a reducing agent selected from the group consisting of boron hydrides, amine boranes, alkylamine boranes, and a source of hypophosphite ion, and an ester complex formed by reacting an inorganic acid with a polyhydric acid or alcohol.

4,019,911

TONER COMPOSITIONS

Bheema R. Vijayendran, Bethel, and R. Clark DuBois, Fairfield, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Division of Ser. No. 416,936, Nov. 19, 1973, Pat. No. 3,939,087. This application Sept. 25, 1975, Ser. No. 616,845

Int. Cl.² C09D *11/00*

U.S. Cl. 106—23 **5 Claims**

1. A hydrophobic, oleophilic concentrate to be used for a liquid toner for use in a copier duplicator, wherein an electrostatic image is created on a photoconductive layer, comprising: 0.1 to 12.0% pigment having a particle size not greater than 25 millimicrons, 10 to 40% polymer having a high affinity for the adsorption of said pigment, 40 to 65% hydrocarbon carrier having a K.B. number less than 30, a dielectric constant of less than 3.5, a resistivity of at least 10^9 ohm centimeters, and a TCC flash point of at least 100° F, said hydrocarbon carrier having a composition containing less than 2% aromatic liquid constituents and said polymer being soluable

in said hydrocarbon carrier and 1.0 to 12% silane treated fumed silica having a particle size of 5 to 15 millimicrons and a BET surface area of 100 to 400 m^2/gm, said silane having some of the bonds of the silane linkage substituted by saturated or unsaturated hydrophobic organic groups.

4,019,912
FRICTIONAL MATERIAL REINFORCED WITH CARBONACEOUS FIBERS

Wilfried Augustin, Reinbek, Germany, assignor to Jurid Werke GmbH, Glinde, Germany

Filed Aug. 31, 1972, Ser. No. 285,524

Claims priority, application Germany, Sept. 4, 1971, 2144367

Int. Cl.² C09K *3/14*

U.S. Cl. 106—36 **1 Claim**

1. A friction material consisting essentially of a compressed and burned mixture of 30–60 parts by weight of a particulate inorganic nonmetallic binder selected from the group consisting of steatite powder, glass frits and clay, 10–30 parts by weight of at least one friction-modifying constituent selected from the group consisting of metal powder, metal fibers, silicon carbide powder and graphite powder, and 30–40 parts by weight of carbonized organic fibers.

4,019,913
PROCESS FOR FABRICATING SILICON CARBIDE ARTICLES

Gerald Q. Weaver, Princeton, and Bradford A. Olson, Leicester, both of Mass., assignors to Norton Company, Worcester, Mass.

Filed July 18, 1975, Ser. No. 597,171

Int. Cl.² C04B *35/56*

U.S. Cl. 106—44 **5 Claims**

1. A process for manufacturing a silicon carbide body which comprises the steps of preparing a fluid mixture of a liquid, fine silicon carbide powder having an average particle size less than 10 microns and colloidal graphite, said graphite being present in an amount of from 5 to 40% by weight of the total weight of graphite and silicon carbide, thoroughly mixing said silicon carbide and graphite, eliminating agglomerates of the powder having a size greater than 325 mesh, drying the powder, forming the dry powder to shape and thereafter firing the shaped body at a temperature in excess of 2000° C. in the presence of silicon to convert the colloidal graphite to silicon carbide.

4,019,914
METHOD OF MANUFACTURING α-ALUMINA

Friedrich Esper, Leonberg, and Karin Bethge, Stuttgart, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 24, 1974, Ser. No. 482,458

Claims priority, application Germany, June 27, 1973, 2332561

Int. Cl.² C04B *35/04, 35/10, 35/12*

U.S. Cl. 106—62 **9 Claims**

1. A process for preparing a finely ground α-alumina with a degree of purity of at least 98% consisting of

a. grinding a mixture of (i) at least one alumina source material selected from the group consisting of aluminum hydroxide and hydrated alumina oxide, and (ii) at least one calcination auxilary agent selected from the group consisting of Fe_2O_3 and Cr_2O_3 in an amount of between 0.03% and 2% by weight based on the total Al_2O_3, to produce an admixture of said alumina souce material and said calcination auxiliary agent ground to a grain size of not more than 0.4 μm which corresponds to a specific surface of at least 5 m^2/g,

said alumina source material containing not more than 0.1% Na, calculated as Na_2O and not more than 0.1% Ti, calculated as TiO_2,

b. calcining said admixture at a temperature of between about 1120° C and 1350° C until said alumina source material is converted into α-alumina with a degree of purity of at least 98%, and

c. cooling said calcined α-alumina and then finely grinding said calcined α-alumina to produce a finely ground α-alumina having excellent sintering activity.

6. The process of claim 1 wherein said admixture also contains MgO in an amount up to 0.5%.

4,019,915
METHOD OF PRODUCING OPTICALLY TRANSPARENT CERAMICS

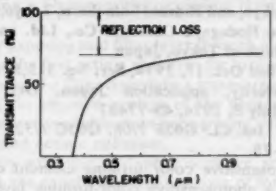
Katsuki Miyauchi; Iwao Matsuyama, both of Hachioji, and Gyozo Toda, Hino, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 21, 1974, Ser. No. 516,498

Claims priority, application Japan, Oct. 19, 1973, 48-116839; Sept. 20, 1974, 49-107821; Sept. 25, 1974, 49-109552; Sept. 25, 1974, 49-109553

Int. Cl.² C04B *35/46*

U.S. Cl. 106—73.31 **21 Claims**



1. A method of producing an optically transparent ceramic having a perovskite-type crystal structure and represented by the general formula ABO_3, wherein the component A consists of Pb and at least one other element selected from the group consisting of Ba and Sr and the component B is selected from the group consisting of Zr or a mixture of Zr and Ti, said method comprising forming a powdery mixture of lead oxide, a solid solution which consists of either barium oxide or strontium oxide or both with an oxide of at least one of the elements of component B, calcining the resultant powdery mixture to form a complex oxide powder, molding said complex oxide powder under pressure to yield a green compact, and hot-pressing said green compact under a pressure greater than 70 kg/cm^2 at a temperature of 1200°–1500° C. for more than 2 hours in an oxygen atmosphere.

4,019,916
AIR ENTRAINING AGENTS

David Stainsley Golightly, and Allan Onions, both of Whitehaven, England, assignors to Albright & Wilson Limited, Warley, England

Filed May 5, 1975, Ser. No. 574,398

Claims priority, application United Kingdom, May 5, 1974, 3766/74

Int. Cl.² C04B *7/35*

U.S. Cl. 106—88 **11 Claims**

1. In the method of making cement based building materials which comprises agitating a mixture containing cement, water and an air entraining agent, and thereby entraining air in the said mixture, the improvement which consists in employing as said air entraining agent, a water soluble sulphosuccinamate salt, said sulphosuccinamate salt being selected from the group consisting of the sodium, potassium, lithium, ammonium, and amine salts of alkyl, alkenyl, alkylalkoxy, alkenyl alkoxy, alkyl polyalkoxy and alkenyl polyalkoxy sulphosuccinamates, wherein said alkyl and alkenyl moieties have from 8 to 22 carbon atoms, and which contain an average of from 0 to 20 alkylene oxide moieties.

4,019,917
EARLY STRENGTH CEMENTS

Ransom James Murray, Gravesend, and Arthur William Brown, London, both of England, assignors to The Associated Portland Cement Manufacturers Limited, London, England

Filed Dec. 1, 1975, Ser. No. 636,457
Claims priority, application United Kingdom, Dec. 9, 1974, 53104/74
Int. Cl.² C04B 7/02, 7/32, 7/35
U.S. Cl. 106—89 16 Claims

1. An early strength hydraulic cement comprising 7.0 to 90 percent by weight of $C_{12}A_7$, the majority of the balance being hydraulic calcium silicates, characterised in that the $C_{12}A_7$ phase is formed in an underlimed clinker burned to a low free lime, an underlimed clinker being defined as a clinker in which the lime limitation factor (LLF) is less than unity where

$$LLF = \frac{CaO}{1.87\ SiO_2 + 0.94\ Al_2O_3 + 0.65\ Fe_2O_3}$$

the chemical symbols representing the amounts of the represented substances present; and in that the underlimed condition is at least counterbalanced in the cement by the presence of a substance effective to increase the basicity of the composition.

4,019,918
PORTLAND CEMENT COMPOSITIONS

Milton Herman Wills, Jr., Adelphi, Md., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Feb. 2, 1976, Ser. No. 654,336
Int. Cl.² C04B 7/02, 7/02, 13/00
U.S. Cl. 106—90 14 Claims

1. A high strength Portland cement mix comprising Portland cement clinker which has been ground to a specific surface area of between about 4400 cm²/g and 6000 cm²/g, alkali or alkaline earth lignosulfonate in an amount of between about 0.75 and 1.25 percent by weight, sodium bicarbonate in the amount of between about 1.5 and 2.5 percent by weight, and gypsum in an amount of between about 1.5 and 4.0 percent by weight, wherein said lignosulfonate and said bicarbonate are present in a ratio of about one to two and wherein a cement product formed from the cement mix will have a porosity of less than about 5% by volume voids, an adequate plastic period of in excess of 90 minutes, and an adequate 1-day strength of in excess of 5000 pounds per square inch.

4,019,919
FULL STRENGTH, LOW DENSITY CONCRETE

Joseph L. DeSalvo, 23509 Ridge Road, Westlake, Ohio 44145

Filed Mar. 23, 1976, Ser. No. 669,685
Int. Cl.² C04B 7/02, 7/35
U.S. Cl. 106—90 2 Claims

1. A high strength concrete composition, said concrete having a binder phase of cement, and an aggregate phase made up at least in part of polyethylene particles, said polyethylene particles having substantially roughened and greatly uneven surfaces with extreme variations in contour thereof on a macro scale, said concrete having an average composition strength of at least 2700 lbs. per square inch, said concrete including said polyethylene particles being substantially free of entrained gas.

4,019,920
GYPSUM SET ACCELERATOR

Edward A. Burkard, East Amherst, and Donald A. Kossuth, Buffalo, both of N.Y., assignors to National Gypsum Company, Buffalo, N.Y.

Division of Ser. No. 514,455, Oct. 15, 1974, Pat. No. 3,920,465, Continuation of Ser. No. 358,191, May 7, 1973, Pat. No. 3,870,538. This application May 23, 1975, Ser. No. 580,136
Int. Cl.² C04B 11/22
U.S. Cl. 106—114 2 Claims

1. The method of making gypsum wallboard comprising the steps of compression milling a mixture of from about 1:3 to about 3:1 parts by weight of calcium sulfate dihydrate and starch for a period of time sufficient to reduce the particle size to provide a surface area of about 10,000 to about 20,000 cm²/gm as measured by a Fisher Sub-Sieve Sizer, mixing said milled mixture into an aqueous slurry comprising the wallboard forming ingredients including a major portion of calcined gypsum and a minor portion water of hydration, fiber reinforcement and density reducing agent, said slurry also including excess water whereby the slurry can be suitably formed, said milled mixture being only separate additive for accelerating the setting and for providing the necessary additional bonding strength needed by the settable gypsum to bond itself to paper cover sheets, disposing said slurry onto paper cover sheets, forming said wallboards of said slurry and paper cover sheets, maintaining said wallboard form while said slurry sets and hardens, and drying said wallboard.

4,019,921
CHEMICAL CONDENSATION PRODUCTS, THEIR PREPARATION AND USE

Adolf Koebner, The Retreat, St. Bees, Cumbria, CA27 OBY, England

Filed Feb. 11, 1975, Ser. No. 549,083
Claims priority, application United Kingdom, Feb. 18, 1974, 7209/74
Int. Cl.² C08J 3/02
U.S. Cl. 106—238 6 Claims

1. A condensation for use in the sizing of paper which consists essentially of unsaponifiable constituents of tall oil having a boiling range of 60° – 160° C at 1 mm Hg, an iodine value of 250 – 350 and an acid value of substantially zero condensed at temperatures between 140° and 260° C with one or more alpha, beta - unsaturated acids and anhydrides thereof selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, fumaric acid, maleic acid, maleic anhydride, itaconic acid, citric acid, and dehydrated citric acid.

4,019,922
FIRE-RESISTANT RESIN

Howard A. Whittum, Worcester, and Michael J. Hjelm, Ashby, both of Mass., assignors to Advance Coatings Company, Westminster, Mass.

Division of Ser. No. 346,354, March 30, 1973, Pat. No. 3,940,549. This application Jan. 22, 1976, Ser. No. 651,446
Int. Cl.² C08L 91/06
U.S. Cl. 106—271 10 Claims

1. A liquid polymerizable mixture comprising
   a. from 4–50 wt.% of a first monomer chosen from the group consisting of hydroxy ethylacrylate, hydroxy propylacrylate, hydroxy butylacrylate, ethylene glycol monoethyl ether acrylate, and diacetone acrylamide,
   b. from 0–50 wt.% of an alkyl methacrylate monomer, and
   c. from 30–70% of a chlorinated paraffin containing from 40–70% chlorine.

4,019,923

POLYDISPERSIBLE PIGMENT COMPOSITIONS

Jean Mahé, Chantilly, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed June 16, 1975, Ser. No. 587,020
Claims priority, application France, Apr. 7, 1974, 74.23263
Int. Cl.² C08J 3/00
U.S. Cl. 106—308 Q 6 Claims

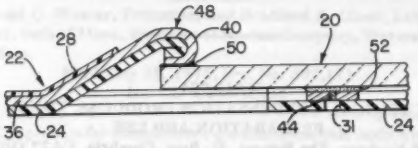
1. A pigment concentrate composition which comprises:
5 to 75% by weight of an organic or inorganic finely divided pigment
15 to 70% by weight of a solvent or mixture of solvents miscible with water
7 to 35% by weight of a dispersing agent consisting of a product of addition of ethylene oxide and castor oil, and a product of addition of ethylene oxide and paranonylphenol.

4,019,924

SOLAR CELL MOUNTING AND INTERCONNECTING ASSEMBLY

William T. Kurth, Wenham, Mass., assignor to Mobil Tyco Solar Energy Corporation, Waltham, Mass.

Filed Nov. 14, 1975, Ser. No. 631,817
Int. Cl.² H01L 31/04
U.S. Cl. 136—89 P 15 Claims



15. In a solar cell assembly of the type comprising at least two solar cells, each having top and bottom surface electrodes, and means for interconnecting said cells comprising a laminate having a first sheet of electrically-insulative material and a layer of electrically-conductive material disposed on said first sheet in a predetermined geometric pattern, said layer comprising first and second portions electrically-insulated from one another, said first portions being electrically-connected to the bottom surface electrode of each one of said cells, said laminate being provided with incisions so as to form a plurality of bendable tabs with each of said tabs including said second portions wherein said second portions are electrically-connected to said top surface electrode of each one of said cells, the improvement comprising:
a second sheet of electrically-insulative material having a plurality of openings and being disposed over said layer so as to expose said first and second portions of said layer through said openings.

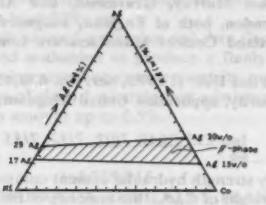
4,019,925

METAL ARTICLES HAVING A PROPERTY OF REPEATEDLY REVERSIBLE SHAPE MEMORY EFFECT AND A PROCESS FOR PREPARING THE SAME

Soji Nenno, Suita, and Kazuyuki Enami, Itami, both of Japan, assignors to Osaka University, Osaka, Japan

Filed Apr. 7, 1975, Ser. No. 565,671
Claims priority, application Japan, May 4, 1974, 49-49901
Int. Cl.² C22F 1/10
U.S. Cl. 148—2 25 Claims

1. A process for preparing metal articles having a property of repeatedly reversible shape memory effect, comprising applying deformation stress to a β-brass type martensitic Ni-Al alloy consisting essentially of 55 –65 at % of Ni and the remainder of Al at a temperature below Md point, in which the value of said deformation stress is within a range exceeding the first yield point of martensite crystal in said alloy beyond easy plastic flow region but below the point at which



a large amount of permanent strain is produced by glide deformation.

4,019,926

PREVENTION OF CORROSION OF METALS

Geoffrey Oliver Lloyd, Twickenham; John Ernest Rhoades-Brown, Hanworth, and Stuart Richard John Saunders, New Malden, all of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed July 1, 1974, Ser. No. 485,017
Int. Cl.² C23F 7/04
U.S. Cl. 148—6.35 6 Claims

1. A method for the diminution of high temperature oxidation in an iron alloy containing from 5% to 20% by weight of chromium comprising,
at least partially enclosing in a oxygen-containing atmosphere said alloy and a volatile inorganic boron compound physically separate from said alloy and selected from the group consisting of borosilicate glasses, sodium metaborate, sodium tetraborate, boric acid, and boric oxide,
treating said boron compound to a temperature sufficient to volatilize at least a component of said volatile inorganic boron compound and
contacting said volatilized component with at least one surface of said alloy at a temperature within the range of 400° C to 900° C, whereby a boron-containing oxide film is formed on the said at least one surface which protects said surface from further oxidation.

4,019,927

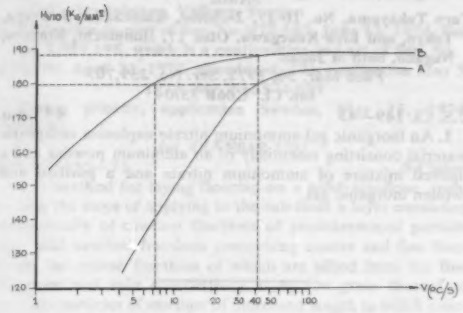
PRODUCTS FORGED IN ALUMINUM ALLOYS WITH IMPROVED MECHANICAL CHARACTERISTICS AND A METHOD FOR OBTAINING SAME

Jean Marie Amédée Bouvaist, Grenoble, France, assignor to Societe de Vente de l'Aluminium Pechiney, Paris, France

Filed Dec. 23, 1974, Ser. No. 535,738
Claims priority, application France, Jan. 7, 1974, 74.00398
Int. Cl.² C22D 1/04
U.S. Cl. 148—11.5 A 10 Claims

1. A method for improving the isotropic structure and lowering the critical quenching rate of wrought products of aluminum alloy by reducing the hydrogen content of the alloy to below 0.1 ppm, maintaining the product for from ½ to 12 hours at a temperature T_t above the solidus temperature T_1 but below the liquidus temperature T_2 while keeping the hy-

drogen content of the alloy below 0.1 ppm and then heat treating the product at a temperature below T_1 to resorb



heterogeneities formed during the preceding heat treatment between T_1 and T_2 and quenching the heat treated product.

4,019,928

PROCESS FOR NITRIDING IRON AND STEEL IN SALT BATHS REGENERATED WITH TRIAZINE POLYMERS

Hermann Beyer; Peter Biberbach, and Christian Scondo, all of Hanau, Germany, assignors to Duetsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Continuation-in-part of Ser. No. 608,240, Aug. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 448,065, March 4, 1974, abandoned. This application June 30, 1976, Ser. No. 701,361

Claims priority, application Germany, Mar. 5, 1973, 2310815; Aug. 29, 1974, 2441310

Int. Cl.² C21D *1/48*

U.S. Cl. 148—15.5 **34 Claims**

1. In a process comprising nitriding iron or steel in a salt bath at nitriding temperature, and regenerating the salt bath ir which there has been loss of cyanate during the nitriding, the improvement comprising heating the iron or steel in a salt bath consisting essentially of a member of the group consisting of:

1. potassium cyanate alone;
2. potassium cyanate admixed with at least one compound of the group consisting of sodium cyanate, potassium carbonate, sodium carbonate and an alkali metal chloride; and
3. sodium cyanate admixed with at least one compound of the group consisting of potassium carbonate, sodium carbonate and an alkali metal chloride,

said bath containing 25–57 weight % cyanate calculated as cyanate ion, 0–5 weight % cyanide calculated as cyanide ion, 0–30 weight % alkali metal chloride and balance potassium ion, sodium ion and carbonate ion and after the cyanate content of the bath has fallen and the carbonate content increased readjusting the cyanate content and carbonate content by adding triazine polymer of the group consisting of melon, melan and melem to the salt bath without removing waste salts from the bath, the amount of said triazine polymer added being 0.5 to 1.5% for each 1% decrease of cyanate.

4,019,929

ENAMELING COLD ROLLED STEEL SHEET WITH A HIGH ENAMEL ADHESIVE PROPERTY

Kazuo Matsudo; Takayoshi Shimomura; Teruo Kurokawa, and Takao Arayama, all of Fukuyama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed May 20, 1975, Ser. No. 579,231

Claims priority, application Japan, June 24, 1974, 49-71381

Int. Cl.² C22C *38/04*

U.S. Cl. 148—31.5 **8 Claims**

1. A cold rolled steel sheet having a Mn content within the range of 0.05 to 0.2 percent by weight, characterized by being obtained by the sequence of steps of preparing said cold rolled steel sheet and degreasing said sheet, and by the relationship between the surface roughness of said sheet and the Mn content thereof satisfying at least one of the following two equations:

(a) Number of peaks of 1.3μ and over per inch $\geq$ 1,200 $\cdot$ (Mn% − 0.1),

(b) Rz, in μ, $\geq$ 60$\cdot$(Mn% − 0.1), wherein Rz is defined by JIS-B 0601,

said steel sheet capable of being enameled without prior pickling and when enameled having a P.E.I. Adherence Index of at least 68 percent.

4,019,930

DEEP HARDENING MACHINABLE ALUMINUM KILLED HIGH SULFUR TOOL STEEL

Paul T. Aylward, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Nov. 19, 1975, Ser. No. 633,343

Int. Cl.² C22C *38/06, 38/60*

U.S. Cl. 148—36 **3 Claims**

1. A low alloy, aluminum killed, water quenched, resulfurized, martensitic, deep hardening steel, highly machinable in the hardened condition consisting essentially of by weight percent:

Carbon	.33 to .42%
Manganese	.70 to 1.25%
Phosphorus	.025% maximum
Sulfur	.03 to .110%
Silicon	.15 to .45%
Aluminum	.019% to .077%
Chromium	.90 to 1.85%
Molybdenum	.10 to .50%

and the balance iron with residual impurities.

4,019,931

THREAD PLATE PROCESS

William C. Setzer, Creve Coeur, Mo.; Harvey P. Cheskis, New Haven, and Michael J. Pryor, Woodbridge, both of Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Mar. 4, 1976, Ser. No. 663,760

Int. Cl.² C22F *1/04*

U.S. Cl. 148—11.5 A **10 Claims**

1. A method for the preparation of aluminum base alloys in wrought form possessing improved tensile properties which consists of:

A. providing an aluminum base alloy containing up to about 1.5% magnesium and up to 1.35% silicon in the cast condition;

B. homogenizing said alloy at a temperature above 900° F for a period of from 8–14 hours;

C. hot rolling said alloy in excess of 20% reduction at a starting temperature of above 900° F;

D. continuously hot rolling said alloy at temperatures below the solubility limit thereof, during which said alloy is held for no more than about 4 minutes at a temperature of about 850° F, no more than about 2 minutes at a temperature of about 800° F and no more than about 1 minute in the temperature range of from about 750°–550° F, and quenching the alloy whereby the temperature of said alloy is reduced to below 550° F in no more than 1 minute.

4,019,932

INCENDIARY COMPOSITION

Fred Schroeder, Lakeview Terrace, Calif., assignor to Dow Corning Corporation, Midland, Mich.

Continuation of Ser. No. 487,474, July 11, 1974, abandoned. This application Apr. 14, 1976, Ser. No. 676,826
Int. Cl.² C06B 45/10, 33/00
U.S. Cl. 149—19.1 6 Claims

1. In combination with an explosive charge an incendiary composition consisting essentially of by weight 20 to 40 percent magnesium powder, 30 to 60 percent metallic oxide chosen from the group consisting of Fe_3O_4, MnO_2 and TiO_2 and the remainder of elastomeric polysiloxane, said remainder being at least 10 percent.

4,019,933

POT LIFE EXTENSION OF ISOCYANATE CURED PROPELLANTS BY AZIRIDINE COMPOUNDS

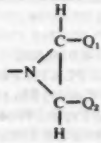
Marjorie T. Cuksee, Huntsville, and Henry C. Allen, Decatur, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 27, 1973, Ser. No. 385,930
Int. Cl.² C06B 45/10
U.S. Cl. 149—19.4 3 Claims

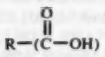
1. An isocyanate curable composite propellant composition having extended pot life, said composition comprised of hydroxy terminated polybutadiene, an isocyanate curing agent, and the inorganic oxidizer, ammonium perchlorate, that is less than 20 micron particle size and the is coated with an aziridine compound selected from compounds represented as follows:

a reaction product formed from tri-aziridinylphosphine oxides or derivatives thereof reacted with monofunctional carboxylic acids, said tri-aziridinylphosphine oxides or derivatives thereof represented by the structure:

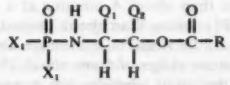
wherein X_1 represents an aziridine group of the structure:



wherein Q_1 and Q_2 are selected from the group consisting of hydrogen or alkyl groups of one to four carbon atoms and said monofunctional carboxylic acid represented by the structure:



wherein R is an organic entity containing one or more carbon atoms, said reactio product represented by the structure:



wherein X_1, Q_1, Q_2, and R are as defined above.

4,019,934

INORGANIC GEL-AMMONIUM NITRATE COMPOSITE MATERIAL AND METHOD OF MANUFACTURING THE SAME

Taro Takayama, No. 10-27, 2-chome, Komazawa, Setagaya, Tokyo, and Eiya Kakegawa, Otsu 17, Honmachi, Komoro, Nagano, both of Japan

Filed Mar. 30, 1972, Ser. No. 239,707
Int. Cl.² C06B 33/04
U.S. Cl. 149—43 4 Claims

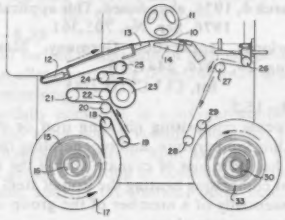
1. An inorganic gel-ammonium nitrate explosive composite material consisting essentially of an aluminum powder and a ripened mixture of ammonium nitrate and a purified and swollen inorganic gel.

4,019,935

AUTOMATIC FEEDING OF LABELS FOR APPLICATION TO BOTTLES OR OTHER CONTAINERS

Albert J. Harvey, Detroit, Mich., assignor to Diamond International Corporation, New York, N.Y.

Filed May 14, 1975, Ser. No. 577,178
Int. Cl.² B65C 1/00
U.S. Cl. 156—64 13 Claims



1. Apparatus for indexing of labels on a label web for movement of the web in register with bottles or the like moved to receive the labels and have them affixed thereto comprising

a label web having register marks thereon and connected between a feed means and a take-up means;

means to detect said register marks, positioned along the path of said label web;

means to move said label web, and stop said label web upon detection of each said register mark, positioned along the path of said label web; and

means along the path of said label web to apply labels from said label web to bottles or the like;

said detecting means including

a roller with a shaft therethrough having said label web pass at least partially around said detecting means roller, and

photoelectric means adjustably mounted on said roller having a light source and a detection photocell adjacently mounted on the same side of said web.

10. A method of indexing labels for application to bottles or the like comprising the steps of

moving the labels on a label web which web is moved between a feed roll and a take-up roll;

detecting register marks printed on said label web of labels at spaced intervals;

metering the feed of the labels to an application station for applying the labels;

moving said label web by reciprocal motion means imparting a start and stop motion to said label web controlled by said detecting means.

4,019,936

METHOD FOR FLOORING ON A CLOSED UNDERLAYER

Erik Gustav Lennart Eriksson, Valberg, Sweden, assignor to AB Karlstadplattan, Valberg, Sweden

Continuation-in-part of Ser. No. 478,952, June 13, 1974, Pat. No. 3,959,195, which is a continuation-in-part of Ser. No. 136,774, April 23, 1971, abandoned. This application May 5, 1975, Ser. No. 574,699

Claims priority, application Sweden, May 15, 1974, 7406503

Int. Cl.² E04B *5/00*

U.S. Cl. 156—71 9 Claims

1. A method for laying flooring on a solid sub-floor, comprising the steps of applying to the sub-floor a layer consisting substantially of sawdust fractions of predetermined particle size, said sawdust fractions comprising coarse and fine fractions, the coarse fractions of which are sifted from the fine fractions and split substantially along the grain thereof to provide particles of sawdust of increased length to width ratio, spreading the sawdust layer on said sub-floor and screeding it with particles of sawdust in said fractions in random orientation relative to said sub-floor to form felted particles to a substantially uniform depth of from 5 to 25 mm, and applying at least one semi to fully rigid plate of predetermined thickness onto said sawdust treated during one of the recited steps of the process with an agent which hardens and binds the sawdust particles, the thickness of the plate being a direct function of the expected load upon and the thickness of the sawdust layer.

4,019,937

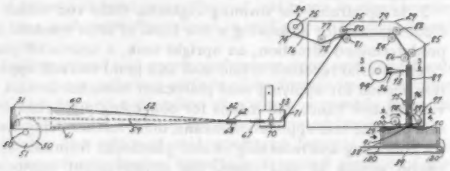
SLEEVED PHOTO ALBUM PAGE AND MEANS AND METHOD FOR MAKING SAME

Sheldon Holson, Norwalk, Conn., assignor to The Holson Company, Wilton, Conn.

Filed Apr. 5, 1976, Ser. No. 673,448

Int. Cl.² B31B *23/60, 23/74*

U.S. Cl. 156—73.1 5 Claims



1. The method of making a photographic print display device, said device including a relatively rigid planar base and a plurality of open-ended sleeve elements hingedly attached thereto in staggered relation, comprising the steps of:

a. providing a rigid planar base having at least one surface for the attachment of said sleeve elements;

b. providing a web of clear heat-sealable synthetic resinous material of indeterminate length;

c. progressively folding said web along a principal longitudinal axis to form an envelope having a pair of abutted longitudinal edges;

d. progressively sealing said edges together to form a flattened sleeve having a pair of longitudinally extending edges;

e. applying a strip of adhesively-surfaced tape to a surface of said sleeve in an area adjacent a longitudinal edge thereof in such manner that a longitudinally extending adhesive-bearing area thereof extends laterally from said edge;

f. serially severing said sleeve and tape at substantially uniformly spaced intervals to form a plurality of open-ended sleeve elements;

g. providing a jigging structure for supporting said sleeve elements in mutually spaced parallel relation with said adhesive laterally-extending areas of said tape projecting therefrom;

h. while maintaining said sleeve elements within said jigging structure, pressing said jigging structure against a surface of said base to simultaneously adhere each of said adhesive laterally extending areas thereto; and

i. removing said sleeve elements from said jigging structure.

4,019,938

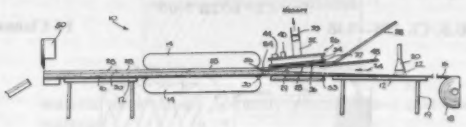
APPARATUS AND PROCESS FOR MANUFACTURING INSULATION BOARD

Harry Forrester, Newton, N.J., assignor to United States Mineral Products Company, Stanhope, N.J.

Filed Jan. 14, 1976, Ser. No. 649,088

Int. Cl.² B32B *5/20*

U.S. Cl. 156—78 19 Claims



1. An apparatus for making a laminate having a foam core sandwiched between a layer of relatively thin flexible material and a layer of relatively thick inflexible material comprising means for moving an elongated sheet of said flexible material from a first station to a second station, dispensing means intermediate said first and second stations for dispensing foam forming urethane chemicals in layer form on said flexible sheet as it moves toward said second station, said foam forming chemicals expanding and adhering to said flexible sheet during movement toward said second station, and depositing means for moving individual undeposited segments of said inflexible material having opposite leading and trailing ends, in a first direction toward said second station and consecutively depositing said individual undeposited segments in side-by-side abutting relationship onto the expanding foam as said foam and said flexible sheet move toward said second station such that the leading edge of a deposited segment abuts against the trailing edge of an adjacent deposited segment, said depositing means including means for impelling the leading end of an undeposited segment against the trailing end of an immediately preceding segment to avoid the formation of gaps therebetween as the undeposited segment moves in said first direction for disposition onto the expanding foam.

4,019,939

PROCESS FOR THE MANUFACTURE OF HOSE

Jean Barbier, Lyon, and Paul Cachon, Caluire, both of France, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 28, 1975, Ser. No. 608,618

Claims priority, application France, Oct. 4, 1974, 74.34177

Int. Cl.² B29C *25/00;* B29B *3/00;* B32B *1/08*

U.S. Cl. 156—80 7 Claims

1. A process for the manufacture of a hose comprising an inner tube and reinforced by a textile or metallic structure surrounding said tube with the constituents of the reinforcing structure being applied to said tube while said tube is supported by a mandrel, the inprovement wherein the hose is manufactured by the successive steps of:

A. introducing a congealable fluid in liquid form into said tube during or after the manufacture of said tube;

B. cooling and solidifying said liquid to form a solid mandrel capable of withstanding mechanical stresses during the manufacture of said hose;

C. applying said reinforcing structure to said tube;

D. converting the solidified liquid into liquid form and curing said hose into an integral structure; and

E. removing the liquid thus formed from said tube.

4,019,940

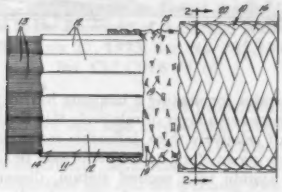
METHOD OF MANUFACTURING PARALLEL YARN ROPE

Henry Alexander Hood, Moorestown, N.J., assignor to Wall Industries, Inc., Beverly, N.J.

Division of Ser. No. 434,627, Jan. 18, 1974, Pat. No. 3,911,785. This application July 25, 1975, Ser. No. 599,108

Int. Cl.² B32B *5/08*

U.S. Cl. 156—148 **14 Claims**



1. A method of making rope, comprising the steps of: advancing lengthwise a plurality of rope yarns each composed of a series of filaments, tensioning said rope yarns as they advance to compact said filaments, coating said rope yarns with a layer of an uncured binder material as said yarns advance under tension to distribute the binder material predominantly on the surface of each rope yarn and to prevent penetration of said binder material deeply into the interior of said rope yarns and among inner ones of the filaments of each rope yarn, joining said yarns together lengthwise in parallel relation to form a core, applying a layer of an uncured binder material on said core, and heating the assembly to cure the binder materials.

4,019,941

METHOD OF CONSTRUCTING CONVEYOR BELTING

Eric Victor Donald Prince, Bulleen; Kenneth Llewellyn Lewis, Doncaster, and Leonard John Michael Ralph, Essendon, all of Australia, assignors to Dunlop Australia Limited, Port Melbourne, Australia

Filed Feb. 28, 1975, Ser. No. 553,981

Claims priority, application Australia, Mar. 18, 1974, 6939/74

Int. Cl.² B29C *27/30*; B32B *27/30*, *27/38*; C09J *7/00*

U.S. Cl. 156—179 **12 Claims**

1. A method of producing steel cord reinforced conveyor belt comprising forming two cover layers of P.V.C. based material with a plurality of longitudinally extending grooves formed in one face of at least one layer, the grooves being shaped and arranged so that when the two layers are assembled with said one face abutting a face of the other layer there is formed a plurality of longitudinal apertures, assembling the two layers to form said apertures with a steel cord in at least some of the said apertures so formed and with a coating of adhesive having a P.V.C. base and including an epoxy resin and an epoxy resin curing agent between each cord and the wall of the aperture that the cord is disposed in, and curing the assembly under heat and pressure.

12. A method of binding a layer P.V.C. to a metal component comprising applying a layer of adhesive having a P.V.C. base and including an epoxy resin and an epoxy resin curing agent between the P.V.C. layer and the metal, and curing the assembly under heat and pressure.

4,019,942

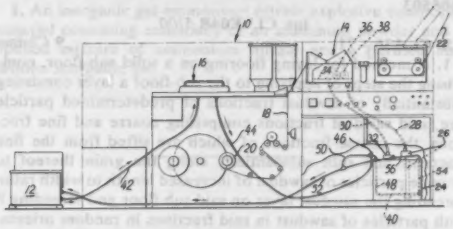
MAINTAINING PLASTICIZER TEMPERATURE IN TOBACCO FILTER ROD FORMATION, AND APPARATUS THEREFOR

James A. Kay, Jr., Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Mar. 12, 1975, Ser. No. 557,514

Int. Cl.² G05G *15/00*

U.S. Cl. 156—180 **4 Claims**



1. In a cigarette filter rod forming operation in which a plasticizer material is conveyed from a pond thereof and applied to a tow band of filter material in an application operation preliminary to enclosing said tow band in a wrapper, the conveyance and application of said plasticizer being made under such conditions that heat is transferred to said plasticizer with a portion of the said plasticizer conveyed to the application operation being returned to said pond whereby the temperature of said pond tends to increase, the improvement of

establishing and maintaining the temperature of said pond of plasticizer material at substantially the ambient temperature of the environment in which said forming operation is carried out by circulating a flow of cooling water through said pond in a closed circuit flow course extending substantially across the full expanse of said pond adjacent the bottom thereof.

3. In apparatus for forming cigarette filter rod which includes means for advancing a tow band of filter material in a predetermined direction, an upright tank, a source of plasticizer material received in said tank as a pond thereof, application means for applying said plasticizer material to said advancing tow band, and means for conveying plasticizer from said pond to said application means, there further being means for collecting and returning unused plasticizer from said application means to said pond, the improvement comprising means for maintaining the temperature of said pond at a value in a predetermined range, said means comprising

a source of circulating cooling fluid,

a coil disposed in said tank, said coil having at least a portion thereof disposed in said pond closely adjacent to but spaced from the bottom of said tank, said portion comprising a plurality of relatively sinuous windings disposed in substantialy planar alignment across substantially the full expanse of said tank, and

means operative for establishing flow communication between said coil and said cooling fluid source whenever the temperature of the plasticizer in said pond exceeds the maximum value in said predetermined range, said means being inoperative whenever the temperature of the plasticizer in said pond is at a value within or below said predetermined range, said means for establishing flow communication between said coil and said cooling fluid source including a three-way valve having connection respectively with said cooling fluid source, said coil, and a by-pass conduit, and a thermostat control sensing the temperature of said plasticizer and operative to orient said three-way valve to pass cooling fluid from said source to said coil, or from said source to the by-pass conduit.

4. The apparatus of claim **3** in which said cooling fluid is chilled water, the plasticizer material being triacetin, and the means for establishing flow communication between said coil

and said pond of cooling fluid being operative whenever the temperature of the plasticizer exceeds 80° F.

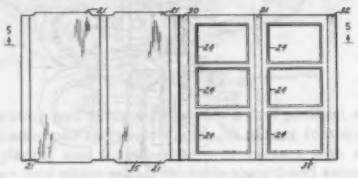
4,019,943
PHOTOGRAPHIC ALBUM PAGE AND METHOD OF MAKING SAME

Sheldon Holson, Norwalk, Conn., assignor to The Holson Company, Wilton, Conn.

Continuation-in-part of Ser. No. 508,526, Sept. 23, 1974, abandoned, which is a division of Ser. No. 422,922, Dec. 10, 1973, Pat. No. 3,869,820. This application Jan. 6, 1976, Ser. No. 646,653

Int. Cl.² B29D *23/10*

U.S. Cl. 156—227 **3 Claims**



1. The method of making a photographic album page comprising the steps of:

providing an elongate planar blank of fibrous material having a pair of longitudinal side edges and first and second free end edges;

delineating three adjacent, substantially equally sized, rectangular areas along the principal axis of said blank to form interconnected first, second and third laminae;

cutting from only two of said first, second and third laminae a corresponding plurality of rows of substantially rectangular apertures to form a pair of apertured laminae, and a single imperforate laminae;

applying an adhesive in a plurality of transversely extending rows to at least one surface of said blank in areas bordering said rows of apertures in said pair of apertured laminae;

folding one of said apertures laminae upon said imperforate lamina to adhere a surface of the former upon the latter, and defined a plurality of pockets accessible from the longitudinal edges of the now laminated laminae; and

folding the other of said apertured laminae; about said imperforate lamina to adhere a second surface of said imperforate lamina and define a second plurality of similar pockets disposed in substantially congruent relation relative to said first set of pockets.

4,019,944
METHOD OF AND HIGH FREQUENCY WELDER ASSEMBLY FOR BINDING A COVER MATERIAL ONTO A BASE MATERIAL

Keiji Tomita, Tondabayashi, Japan, assignor to Kabushiki Kaisha Tomita Sangyo, Osaka, Japan

Filed Mar. 19, 1975, Ser. No. 559,703

Claims priority, application Japan, Dec. 6, 1974, 49-144795

Int. Cl.² B32B *19/02, 3/04*

U.S. Cl. 156—380 **5 Claims**

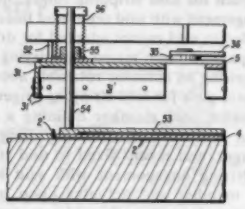
1. Apparatus for binding the marginal edge of a cover material which has been folded over a base material, the apparatus comprising:

means for generating high frequency electrical energy;

pressing means comprising a folding frame for pressing said marginal edge against said base material and applying said electrical energy to said marginal edge to bind it to said base material;

said pressing means including an electrically conductive first portion for conducting said high frequency electrical energy comprising at least one vertical disposed member extending along the length of said marginal edge, and at least one electrically insulative second portion comprising a layer of electrically insulative material disposed along at least one side of said vertically disposed member, where both said first and second portions contact said marginal edge so that the heat applied across the width of said marginal edge varies;

a table adapted to dispose said cover material under said base material so that said marginal edge of the cover



material substantially vertically extends above said base material;

means for lowering said folding frame to said table and including means for maintaining sections of said folding frame in a separated condition while said frame is being lowered to said table; and

means for drawing said folding frame sections together after said frame has been lowered to the table to fold and press the marginal edge over the base material.

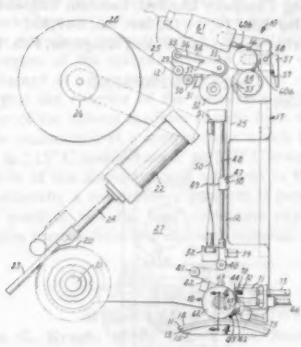
4,019,945
STRIP APPLYING DEVICE

Thomas F. Look, New Brighton; Richard T. Podvin, Fridley, and Carlyle A. Weigel, Maplewood, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 10, 1976, Ser. No. 665,411

Int. Cl.² B29H *17/20, 21/02*

U.S. Cl. 156—405 **8 Claims**



1. In a device adapted for applying lengths of elastic reflex-reflective strip material to tire casings from a supply length of strip material having a protective liner applied thereto, said device comprising means adapted for driving a said tire casing past an applying station; a head assembly including a frame, an applying wheel rotatably mounted on said frame, and means for defining a path for said strip material along said frame including a path portion partially around said applying wheel; means mounting said head assembly for movement between a spaced position spaced from said applying station and an applying position with said wheel positioned to press strip material along the path portion thereon against the tire casing at said applying station to apply strip material as the tire casing

is driven past the applying station; and means along said path in advance of said applying wheel adapted for stripping said liner from said strip material, the improvement wherein said means for stripping said liner comprises a stripping finger adapted for guiding said liner around approximately an 180° turn; means mounting said striping finger for movement relative to said frame along a linear path parallel to a linear portion of said path for said strip material with said stripping finger oriented to guide srid liner about said turn throughout said linear path for said stripping finger; means adapted for driving engagement with said separated liner; a variable speed motor coupled to said means adapted for driving engagement with said separated liner; means for varying the speed of said motor comprising an actuator rotatable about an axis aligned parallel to said path for said stripping finger, a member fixed to said actuator, said member defining a surface generally helical about said axis and extending along the path for said stripping finger, and means fixed to said stripping finger for providing driving engagement with said helical surface to rotate said member and actuator upon movement of said stripping finger along its path, said actuator being connected to increase the speed of said motor upon movement of said stripping finger along its path toward said applying wheel, and to decrease the speed of said motor upon movement of said stripping finger along its path away from said applying wheel to adjust the rate of speed of said means adapted for driving engagement with said separated liner to the same rate of speed at which the strip material is being applied to said tire casing.

4,019,946

HEAT SEALING APPARATUS

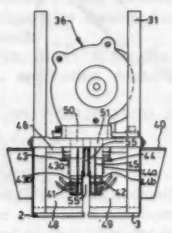
Samuel Greisman, London, England, assignor to The Thames Sack and Bag Company Limited, London, England

Filed Feb. 14, 1975, Ser. No. 549,855

Claims priority, application United Kingdom, Feb. 14, 1974, 6832/74

Int. Cl.² B29D *23/00*

U.S. Cl. 156—497 **13 Claims**



1. A hot air heat sealing apparatus for sealing together two layers of heat softenable plastics material comprising a fan, ducting arranged to divide the air stream from the fan into at least two flows, a heater disposed in the path of one of said flows, means by which air heated by the heater is directed in use onto the layers of plastics material thereby to soften said layers at a region thereof where they are to be sealed together, means for pressing the layers together to form a seal, and guide means disposed in the path of the other of said flows for guiding said other flow into contact with said layers above said region, to cool the area above said region whereby said layers are not softened above said region.

4,019,947

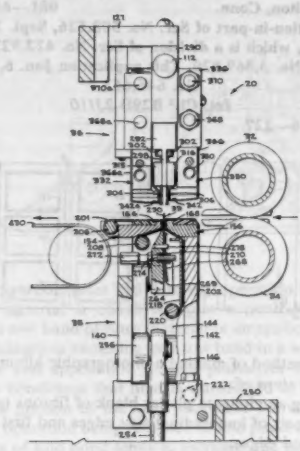
MULTIPURPOSE SEALING AND SEVERING METHOD AND MECHANISM

David K. Stock, and Robert J. Wech, both of Green Bay, Wis., assignors to FMC Corporation, San Jose, Calif.

Filed Sept. 10, 1975, Ser. No. 612,059

Int. Cl.² B32B *31/00*

U.S. Cl. 156—510 **30 Claims**



1. A multipurpose sealing and severing mechanism for making articles from a web of thermosealing material comprising: means for moving the web in a feed direction along a predetermined path; opposed pairs of sealing bars disposed on opposite sides of the path of movement of the web for applying sealing pressure to the web in two transverse zones; heating means associated with each sealing bar for raising the web to a bonding temperature along said zones when activated; severing means movable in a cutting plane extending transversely of the web and disposed between said zones; means for clamping the web between the sealing zones and both sides of said cutting zones; drive means for moving a sealing bar of each opposed pair of sealing bars and said clamp means into pressure engagement with the web and for causing said severing means to sever the web; and selectively operable electrical control means for connecting or disconnecting one or both pair of said opposed pairs of heating means from a source of electrical power.

23. In a sealing and severing mechanism for making articles from a web of thermosealing material, web clamping means comprising; a segmented row of clamping elements, support means for supporting said clamping elements for limited sliding movement relative thereto, resilient means in said support means for independently urging each clamping element toward the web, means for moving said support means and clamping elements toward the web with each said clamping element being moved into independent resilient engagement against the web for applying a uniform clamping force on the web throughout substantially the full length of the segmented row of clamping elements, and force resisting means on the other side of the web for resisting the clamping force.

4,019,948

APPLICATOR FOR HEAT-ACTIVATABLE TAPE

Mark G. Hudalla, St. Paul, and Steven C. Schultz, Hastings, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

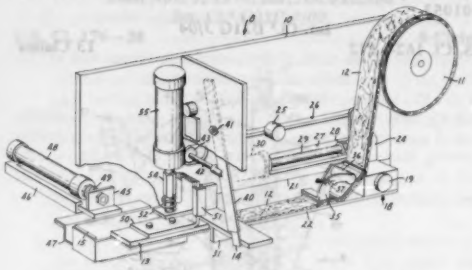
Filed Sept. 22, 1975, Ser. No. 615,774

Int. Cl.² B65C *9/18*, *9/25*

U.S. Cl. 156—519 **10 Claims**

1. A tape applicator for applying strips of tape to a receptor

surface, which tape has a fibrous surface opposite an adhesive coated surface, said applicator comprising an applicating pad having a tape supporting and applying surface substantially covered by a plurality of wire bristles extending parallel to each other and terminating in a plane, a support for said applicating pad, and means for moving said support and said



applicating pad along a path from a first position where said applicating pad can receive a length of tape to a second position placing said length of tape in contact with a receptor surface, and platen means movable toward and away from said bristles for transporting a length of tape into contact with said bristles.

4,019,949

HEAT SEALING APPARATUS

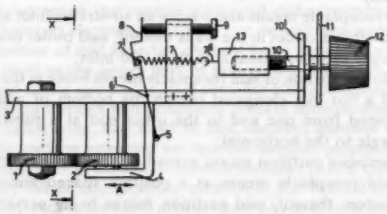
Samuel Greisman, London, England, assignor to The Thames Sack and Bag Company Limited, London, England

Filed Mar. 11, 1975, Ser. No. 557,327

Claims priority, application United Kingdom, Mar. 12, 1974, 11059/74

Int. Cl.² B32B *31/00*; B30B *3/04*

U.S. Cl. 156—582 **4 Claims**



1. A heat sealing apparatus for sealing together two layers of heat softenable plastics material, for example two sides of the top of a bag or sack, comprising a frame, a first roller mounted on the frame for rotation about a fixed axis, a carrier slidably mounted on the frame for rectilinear movement perpendicular to said fixed axis, a second roller mounted on said carrier for rotation about an axis parallel to said fixed axis, spring loading means acting on said carrier to urge said second roller towards said first roller, stop means inhibiting the loading of the spring loading means on the carrier in the absence of layers of plastics material between the rollers, said spring loading means comprising a lever and a spring arranged to urge the lever to bear at one end thereof against the stop means, and at the other end thereof against said carrier, thereby to urge said carrier and the second roller mounted thereon towards said first roller.

4,019,950

CRYSTALS AND THEIR MANUFACTURE

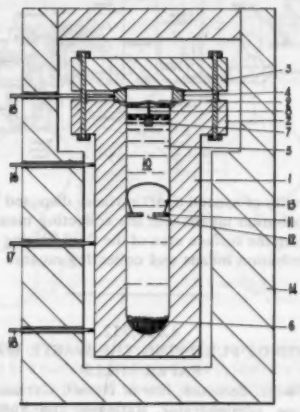
Derek Francis Croxall, London; Robert Christopher Kell, South Harrow, and Robert Lambert, Eastbourne, all of England, assignors to The General Electric Company Limited, London, England

Filed Nov. 7, 1975, Ser. No. 629,800

Claims priority, application United Kingdom, Nov. 25, 1974, 50933/74

Int. Cl.² B01J *17/04*; C01G *21/14*

U.S. Cl. 156—623 R **7 Claims**



1. A method of manufacturing crystals of lead carbonate, which comprises heating in a sealed autoclave, under pressure of 500 to 1500 atmospheres, a quantity of nutrient material consisting of a compound of lead which is a member of the group consisting of the carbonate and the basic carbonate, in contact with a solvent medium consisting of an aqueous solution of an alkali metal bicarbonate of concentration in the range of 0.5 to 5.0 molar, which solvent medium occupies from 80 to 95% of the free space in the autoclave chamber, the autoclave being heated in such a manner that the exterior of the autoclave wall adjacent to the nutrient material and to the region of the solvent medium in the vicinity thereof is maintained at a temperature in the range of 200° to 400° C and that the exterior of the autoclave wall adjacent to the region of the solvent medium remote from the nutrient material is maintained at a temperature which is in the range of 170° to 315° C and is from 5° to 150° C lower than that of the exterior of the autoclave wall adjacent to the nutrient material, whereby a temperature gradient is produced in the solvent medium and the lead carbonate crystallises out in a location remote from the nutrient material.

4,019,951

MAGMA COOLING TOWER

Loren G. Kragh, 29600 Eighth Ave. South, Federal Way, Wash. 98002

Filed July 20, 1973, Ser. No. 381,340

Int. Cl.² B01D *1/16*, *1/00*

U.S. Cl. 159—4 CC **7 Claims**

1. A crystallizing evaporator comprising:

means forming a fluid circulation loop having an input and an output wherein the output of the loop comprises mechanical separating means connected in parallel with the loop;

seed crystal injecting means connected to the said loop;

a source of heat energy disposed within said loop to raise the temperature of fluid circulating therein;

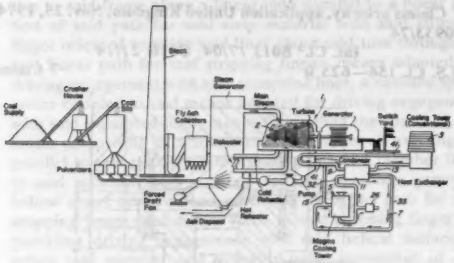
an evaporator disposed in said loop comprising:

an enclosed housing having an opening in the top thereof

and vent means in the lower sides thereof to permit a flow of air therethrough;

fluid distribution means disposed within the top portion of the housing and connected to the said loop;

fluid collecting means disposed at the bottom of the housing and connected to the said loop;



a plurality of spaced apart surfaces disposed between the distribution means and the collecting means for maximizing the surface area of the fluid flowing between the distribution means and collecting means.

4,019,952

METHOD OF PURIFYING THE WASTE WATER OF PAPER MILLS

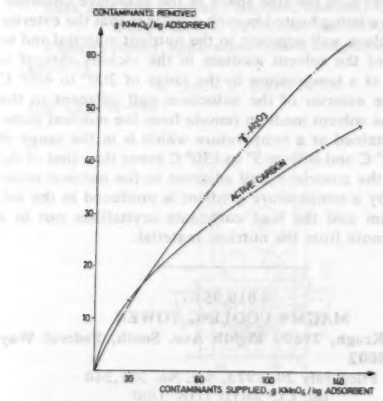
Theodor Ploetz, deceased, late of Hoesel, Germany; by Adelbert Hasse, administrator, Ratingen, and Volker Franzen, Heidelberg, both of Germany, assignors to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung, Duesseldorf-Oberkassel, Germany

Continuation-in-part of Ser. No. 461,613, April 17, 1974, abandoned. This application Dec. 12, 1975, Ser. No. 639,996

Claims priority, application Germany, Apr. 25, 1973, 2320799

Int. Cl.² C02C *5/02, 5/10*

U.S. Cl. 162—29 **3 Claims**



1. A method of purifying waste water of a paper mill of contaminating, oxygen-demanding lignin values which comprises:

a. holding granular γ-alumina in contact with said waste water until said lignin values are adsorbed on said alumina and the oxygen demand of said waste water is reduced; and

b. separating the waste water of reduced oxygen demand from the alumina having said lignin values adsorbed thereon.

4,019,953

APPARATUS FOR REMOVING DUST FROM REGION ADJACENT DOCTOR BLADE

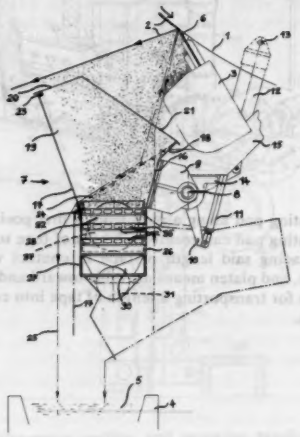
Karl Gustav Nystrom, Vaxjo, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden

Filed Jan. 22, 1976, Ser. No. 651,587

Claims priority, application Sweden, Jan. 31, 1975, 7501053

Int. Cl.² D21G *3/04*

U.S. Cl. 162—272 **13 Claims**



1. In combination with doctor blade means operable to produce dust in a dust production region adjacent said doctor blade:

dust pick-up receptacle means forming an open-topped chamber adjacent said dust-production region for receiving said dust, said receptacle means having opposite lateral wall portions which diverge from each other in the direction toward said dust-production region and shield members associated therewith for at least partially confining said dust to the vicinity of said region of its production;

said receptacle means also having an air-stream inlet and an air-stream outlet in the walls thereof, said outlet being of larger cross-sectional area than said inlet;

the lower portion of said receptacle means being in the form of a box-like elongated trough the bottom of which is sloped from one end to the other end at a substantial angle to the horizontal;

foraminous partition means extending across the interior of said receptacle means at a position spaced above the bottom thereof, said partition means being pervious to said dust;

means mounting said receptacle means pivotably and independently of said doctor blade means to permit swinging said receptacle means into and out of adjacency to said dust production region;

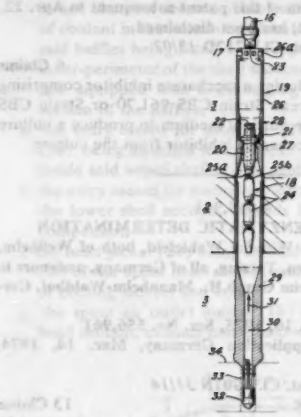
said mounting means comprising shaft means, support means pivotably mounting said receptacle means on said shaft means, fluid-pressure operable cylinder means including piston means reciprocable therein, and swinging arms connecting said piston means to said support means for pivoting said receptacle means in response to reciprocation of said piston means; and

means responsive to air supplied from said inlet for forming a plurality of higher speed jets directed toward said outlet to entrain and remove dust-laden air in said receptacle by way of said outlet.

4,019,954
SAFETY DEVICE FOR A NUCLEAR REACTOR AND ESPECIALLY A FAST REACTOR

Fernand Giordano, Saint-Etienne; Pierre Marmonier, and Jean Vayra, both of Aix-en-Provence, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Nov. 7, 1974, Ser. No. 521,900
Int. Cl.² G21C 9/00
U.S. Cl. 176—38 5 Claims



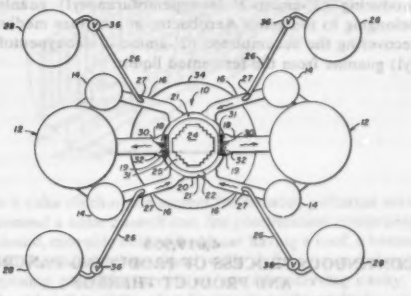
1. In a fast nuclear reactor having a reactor core, a safety device comprising an articulated absorber element, a supporting head for said element, a disconnectable coupling joining said head to the lower extremity of an axially movable vertical operating stem, said absorber element after separation of the disconnectable coupling dropping under gravity from a top position to a bottom position within a passage through the reactor core, a casing for said passage open at the upper extremity thereof and located within the core among wrappers containing nuclear fuel and having the same length as said wrappers, the upper part of said casing being located at the same level as said wrappers, the reactor core being cooled by an upward circulation of liquid metal, a central fuel zone in said core, a peripheral blanket zone in said core which completely surround the central zone, said disconnectable coupling being an electromagnet armature on said stem and in the top position of said absorber element being located about the same level as the upper part of said casing, said head being engaged within said casing, said absorber element extending in said casing through said peripheral blanket zone externally of said central zone, said head of said absorber element in the bottom position engaging an external annular projection on said head with an internal abutment shoulder in said casing to stop the fall of said absorber element at the vertical level of said central core zone and means formed by said head and said casing for damping the fall of said element by acting on said head of said absorbent element.

4,019,955
VESSEL STEAM RELIEF SYSTEM FOR A NUCLEAR REACTOR

Francis Thomas Grubelich, Wethersfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 31, 1975, Ser. No. 645,494
Int. Cl.² G21C 9/00, 15/24
U.S. Cl. 176—38 10 Claims

1. An improved nuclear reaction having a pressure vessel which has first and second nozzle penetrations therethrough, said first nozzle penetration affording an entrance for coolant into said pressure vessel and said second nozzle penetration affording an exit for coolant from said pressure vessel, a core support barrel suspended on the inside of said pressure vessel, said core support barrel separating the interior of the pressure vessel into first and second regions, said first region comprising that space which lies exterior to said core support barrel and being in fluid communication with said first nozzle penetration and said second region comprising that space which lies interior to said core support barrel and being in fluid communication with said second nozzle penetration, and a nuclear core through which coolant flows from the first region to the second region supported within said core support barrel, wherein the improvement comprising:



a. a plurality of passages through said core support barrel arranged in a pattern which girdles a cylindrical section of said core support barrel, thereby connecting said first and second regions; and

b. a rupturable seal band whose width is larger than the diameter of said passages, said seal band encircling the exterior of said cylindrical section of said core support barrel and held in flow blocking position adjacent to said passages.

4,019,956
PROCESS FOR RECOVERING HAIR BY DISSOLVING THE SKIN OR HIDE

Carnot E. A. R. Saby, Saint Quentin, France, assignor to Omnium de Prospective Industrielle, S.A., Neuville Saint Amand, France

Filed July 22, 1975, Ser. No. 598,028
Claims priority, application France, July 30, 1974, 74.26342
Int. Cl.² C12B 1/00
U.S. Cl. 195—6 11 Claims

1. In a process for recovery of hair by dissolving the epidermal layers of animal skins or hides in a solution of bacterial protease, wherein said skins or hides are first rehydrated in water and thereafter scoured in an aqueous solution, the improvement comprising: (a) predigesting and plumping the rehydrated and scoured skins in a bath containing an effective amount of sodium perborate and 1 to 10% by weight urea based upon the weight of dried skins or hides at a pH of 8 to 10 for sufficient time to predigest and plump said rehydrated and scoured skins; (b) adding 0.5 to 5% by weight of a bacterial protease based upon said weight of dried skins or hides to said bath to complete the digestion of the epidermal layer and to separate hair therefrom; and (c) recovering the separated hair.

4,019,957

PROCESS FOR PRODUCING (2'-AMINO-2'-DEOXYPENTOFURANOSYL) GUANINE

Takeo Suzuki, Hofu, and Toshihide Nakanishi, Machida, both of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 516,708, Oct. 21, 1974, Pat. No. 3,987,030. This application July 19, 1976, Ser. No. 706,865

Int. Cl.² C12D *13/06*

U.S. Cl. 195—28 N 8 Claims

1. A process for producing (2'-amino-2'-deoxypentofuranosyl) guanine, comprising culturing a microorganism capable of producing (2'-amino-2'-deoxypentofuranosyl) guanine and belonging to the genus Aerobacter in a culture medium, and recovering the accumulated (2'-amino-2'-deoxypentofuranosyl) guanine from the fermented liquor.

4,019,958

CONTINUOUS PROCESS OF PRODUCING PANCREATIN AND PRODUCT THEREOF

Hans Hell, Neustadt am Rubenberg; Günter Peschke, Hannover; Horst Oppermann; Rudolf Kaufung, both of Neustadt am Rubenberg; Siegfried Funke, Hannover, and Werner Stühmer, Springe, all of Germany, assignors to Kali-Chemie Pharma GmbH, Hannover, Germany

Filed Mar. 19, 1976, Ser. No. 668,524

Claims priority, application Germany, Mar. 22, 1975, 2512746

Int. Cl.² C07G *7/026*

U.S. Cl. 195—62 13 Claims

1. A process of producing pancreatin of a high amylolytic, lipolytic, and proteolytic activity, said pancreatin having a low germ content and being substantially free of fibrous tissue material, comprising the steps of:

a. contacting frozen, finely comminuted pancreas glands with a mixture of liquid chlorinated hydrocarbon and of a liquid fluoro-chloro-carbon, wherein the ratio of chlorinated hydrocarbon to fluoro-chloro-carbon is between 1:0.05 and 1:2.0, for a period of time sufficient to remove the fat therefrom and to destroy the pathogenic germs;

b. separating the fat-solvent phase from the enzyme phase;

c. concentrating the enzyme phase; and

d. drying the concentrated enzyme phase.

4,019,959

BACTERIAL PRODUCTION OF LIPASE AND PYOCYANINE FROM N-PARAFFINS

Len J. Gawel, Ponca City, Okla., and Chi-Sin Chen, San Jose, Calif., assignors to Continental Oil Company, Ponca City, Okla.

Filed Oct. 6, 1975, Ser. No. 620,490

Int. Cl.² C12D *13/10*; C07G *7/02*

U.S. Cl. 195—66 R 6 Claims

1. A method for the bacterial production of Lipase from n-paraffin substrates comprising growing a Pseudomonas-like bacteria designated NRRL B-8110 on a substrate comprising n-paraffins having from 10 to 22 carbon atoms (b) allowing the bacterial cell growth to reach optimum levels; (c) separating the cells from the substrate; (d) rupturing the cell walls; (e) removing cell debris; and (f) recovering the lipase.

4,019,960

PROCESS FOR THE PRODUCTION OF A SACCHARASE INHIBITOR

Werner Frommer; Walter Puls, and Delf Schmidt, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 28, 1973, Ser. No. 336,741

Claims priority, application Germany, Mar. 1, 1972, 2209834

The portion of the term of this patent subsequent to Apr. 22, 1992, has been disclaimed.

Int. Cl.² C12D *13/02*

U.S. Cl. 195—80 R 6 Claims

1. A method of producing a saccharase inhibitor comprising growing Actinoplanaceae Strain CBS 961.70 or Strain CBS 617.71 in a starch-free nutrient medium to produce a culture and separating the saccharase inhibitor from the culture.

4,019,961

ANALYTICAL ENZYMATIC DETERMINATION

Sigmar Klose; August Wilhelm Wahlefeld, both of Weilheim, and Alexander Hagen, Tutzing, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed Mar. 10, 1975, Ser. No. 556,961

Claims priority, application Germany, Mar. 14, 1974, 2412354

Int. Cl.² G01N *31/14*

U.S. Cl. 195—103.5 R 13 Claims

1. In an analytical process for enzymatic determination of a substrate in a biological fluid by phosphorylation of a substrate with ATP with the liberation of ADP, reaction of ADP with phosphoenol pyruvate in the presence of pyruvate kinase with the formation of pyruvate, hydrogenation of the pyruvate with NADH in the presence of lactate dehydrogenase, the improvement which comprises,

reacting the biological fluid substrate, in the absence of its specific kinase but in the presence of a NADH-regenerating enzymatic system which is the specific dehydrogenase and a substrate for the dehydrogenase with adenoisine triphosphate, phosphoenol pyruvate, and NADH,

separating the enzymes from the reaction mixture,

adding the specific kinase for the substrate, pyruvic kinase and lactate dehydrogenase to the liquid product free of enzymes,

measuring the NADH consumption, thereby measuring only the amount of phosphorylated substrate.

4,019,962

APPARATUS FOR AEROBIC FERMENTATION

Richard L. Allen, Munster; Benny M. Benjamin, Skokie; Terry A. Lappin, Naperville; John A. Ridgway, Jr., La Porte, and Elmer J. Saunders, Downers Grove, all of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Aug. 11, 1975, Ser. No. 603,460

Int. Cl.² C12B *1/00*

U.S. Cl. 195—142 13 Claims

1. Apparatus for continuous aerobic fermentation processes for growth of single-cell microorganisms including a vertical cylindrical fermentor vessel shell component (1) having an upper and lower section, which has attached thereto:

a. a coolant inlet means (16) extending inside through the wall of said vessel shell component and attached to the inlet coolant header (22) located within said shell component, and a coolant outlet means (15) extending inside through the wall of said vessel shell component and attached to the outlet coolant header (23) located within said shell component, both said coolant means (15, 16) being situated near the upper end of the fermentor shell section to describe a continuous flow therethrough;

b. the said inlet coolant header (22) and said outlet coolant header (23) are positioned horizontally in the upper

section of the fermentor, each said headers having a separate sealable attachment to a single chamber section (25) within the vertically aligned hollow baffles (14) located within said vessel shell component;

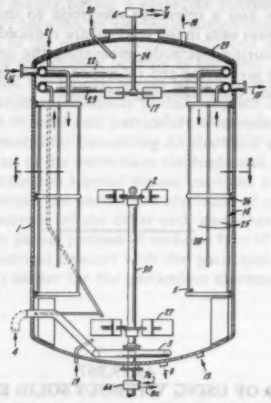
c. the plurality of said hollow baffles (14) have a partially partitioned interior section created by the vertical shield (28) extending from an upper position inside the baffle to a position near the bottom therein to create chamber sections (25) which permit the downward flow of coolant in one chamber section of the baffle and the upward flow of coolant in the remaining chamber section of the baffle, said baffles being fitted with support mounts (26) to the inner-perimeter of the shell section in a vertical alignment and equipped with a drain plug (5) near the bottom section of the baffles;

d. the entry means for substrate (21), and macro-nutrient (20), being attached to the upper head section extending inside said vessel shell component;

e. the entry means for micro-nutrient (19) being attached to the lower shell section, extends inside said vessel shell component;

f. the head jacket (29) being located along the inner perimeter of the upper head section said head jacket consisting of cooling jackets and coils;

g. the spent air outlet means (18) attached to the upper head section, extends inside said vessel shell component;



h. the foam knocker (17) positioned within the upper head section adjacent to said inlet and outlet coolant headers (22, 23), said knocker having a shaft (24) extending vertically through the top shell section;

i. the flat blade turbine agitators (2) and (27) having an agitator shaft (30) extending vertically into the fermentor vessel through the lower shell section;

j. the air sparger (3) located inside the lower shell section beneath the lowest most flat blade unit (27) which is attached to an air inlet (4) entering from the lower shell section of the fermentor vessel;

k. the double mechanical seals (6) and (6*a*) are located on the said agitator and foam knocker shafts (24) and (30) outside the fermentor vessel, said seals (6) and (6*a*) having entry means (7) and (7*a*) and exit means (8) and (8*a*) for bactericidal liquid; and

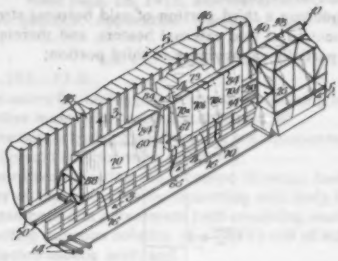
l. the non-vaporlocking circulating pump (10) is attached to the lower exterior section of the fermentor vessel through the broth line (9) extending from within the fermentor vessel and connected to hydroclone unit(s) (11) which has a froth line (13) attached to the exterior section of the fermentor vessel and a de-aerated broth line (12) affording a discharge means for the liquid broth from said pump.

4,019,963

COKE DISCHARGING SYSTEM

John F. Hanley, Jr., Roswell, Ga., assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Oct. 6, 1975, Ser. No. 619,850
Int. Cl.² C10B 27/00
U.S. Cl. 202—263 **7 Claims**



1. In a coke discharging system for reduced pollutant emissions around a coke quench car, the combination comprising: an enclosed, movable coke quench car having a roof, a bottom wall and forward and rearward walls defining one enlarged side opening providing access to a coke-receiving cavity, a hood connected to the roof and extending sidewardly in overhanging relationship with respect to vertical edges on said forward and rearward walls, means connected to said quench car for providing a draft through said opening and through said cavity, a coke push guide positioned between said quench car and a coke oven, said push guide having a planar forward surface with an opening adapted to be aligned with a portion of said side opening in said quench car, a pair of closure plates associated with said push guide and extending in opposite directions from said push guide, the forward faces of said closure plates define a forward surface substantially common with the forward surface of said push guide, each closure plate extends horizontally from said opening in the push guide a distance substantially equal to the length of the side opening in the quench car minus the width of the push guide and being horizontally spaced a short distance from said vertical edges of said side opening to form narrow gaps therebetween, said closure plates extending vertically from a location closely spaced from the bottom wall of the quench car to form a bottom gap, to a location closely spaced from the roof of the quench car to form a top gap therebetween, whereby the inflow of air created by said draft is concentrated through said gaps into said cavity to pick up and transport the emissions from coke being pushed into said cavity.

4,019,964

METHOD FOR CONTROLLING THE REBOILER SECTION OF A DUAL REBOILER DISTILLATION COLUMN

R. Gene Fickel, Roselle, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 459,992, April 11, 1974, abandoned. This application June 16, 1975, Ser. No. 587,469
Int. Cl.² B01D 3/42
U.S. Cl. 203—1 **3 Claims**

1. A method for controlling heat input to the reboiler section of a distillation column comprising a reboiler section and a fractionation section, said column having two external heat-recovery reboiler heaters appurtenant thereto, which method comprises the steps of:

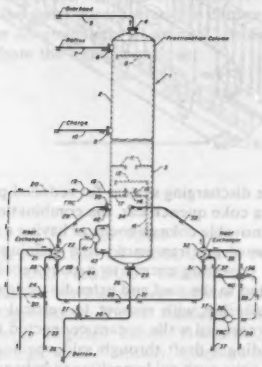
a. withdrawing a liquid bottoms stream from said reboiler section;

b. regulating the quantity of a first portion of said bottoms stream removed from said distillation column as a bottoms product, in response to the level of liquid in said reboiler section;

c. introducing a second portion of said bottoms stream into a first of said external heaters, and therein heating and partially vaporizing said second portion via indirect contact therein with an external process stream;

d. passing the heated, mixed-phase second portion of said bottoms stream into a substantially liquid-free area of said reboiler section, and therein disengaging liquid from said heated mixed-phase;

e. introducing a third portion of said bottoms stream into the second of said external heaters, and therein heating and partially vaporizing said third portion;



f. passing the heated, mixed-phase third portion of said bottoms stream into said substantially liquid-free area of the reboiler section, and therein disengaging liquid therefrom;

g. measuring, within said reboiler section, the quantity of vapor passing upwardly from the reboiler section into said fractionation section of said distillation column; and

h. regulating the heat input to said second external reboiler heater in response to a signal representative of the measured quantity of vapor passing into said fractionation section, thereby regulating the heat input to said reboiler section.

4,019,965

SEPARATION OF PHENOL, CYCLOHEXANONE, AND CYCLOHEXYLBENZENE CONTAINING MIXTURES EMPLOYING DIALKYL AND DICYCLOALKYL PHTHALATES

George B. Fozzard, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 20, 1976, Ser. No. 706,993

Int. Cl.² B01D *3/40;* C07C *39/04, 49/30*

U.S. Cl. 203—60 4 Claims

1. An extractive distillation of a mixture containing phenol and cyclohexanone, which mixture may contain cyclohexylbenzene which comprises employing as a solvent at least one of dialkyl and a dicycloalkyl phthalate.

4,019,966

METHOD OF AMPEROMETRIC DETERMINATION OF THE CONCENTRATION OF ARENDIAZONIUM SALTS

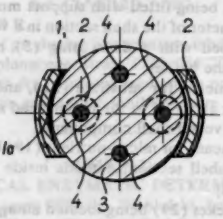
Miroslav Remes; Miroslav Matrka, and Zdenek Sagner, all of Pardubice, Czechoslovakia, assignors to Vyzkumny ustav organickych syntez, Pardubice, Czechoslovakia

Filed June 4, 1976, Ser. No. 583,632

Claims priority, application Czechoslovakia, June 4, 1974, 3947/74; Dec. 6, 1974, 8345/74

Int. Cl.² G01N *27/46*

U.S. Cl. 204—1 T 2 Claims



1. In an amperometric method of determining the concentration of arendiazonium salts in a diazocoupling reaction mixture, the method comprising the steps of applying a DC voltage across a tellurium measuring electrode in contact with the mixture and a reference electrode so that only ions of arendiazonium salts in the mixture are reduced on the surface of the measuring electrode, measuring the resultant current through the measuring and reference electrodes, and periodically cleaning the measuring electrode.

4,019,967

METHOD OF USING VITREOUS SOLID ELECROLYTE

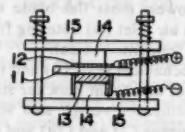
Shoji Tsuchihashi; Yoji Kawamoto, both of Kobe, and Masayoshi Inoue, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 444,802, Feb. 22, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,350

Claims priority, application Japan, Feb. 28, 1973, 48-23858; Feb. 28, 1973, 48-23859

Int. Cl.² G01N *27/46;* H01M *6/18;* H01G *9/00*

U.S. Cl. 204—1 T 4 Claims



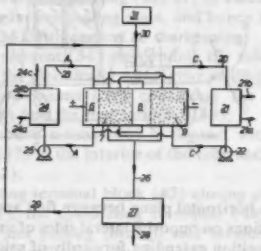
1. In a method of using a solid electrolyte in a silver ion concentration cell, the improvement wherein the solid electrolyte is a vitreous solid electrolyte composition of the formula As-S-Ag lying within the range defined by the quadrilateral having apices $As_{24}S_{56}Ag_{10}$, $As_{20}S_{50}Ag_{30}$, $As_{16}S_{44}Ag_{40}$, $As_{23.5}S_{46.5}Ag_{30}$ in the triangular phase diagram indicating the atomic percentages of As-S-Ag in FIG. 1B of the attached drawing.

4,019,968

ELECTROCHEMICAL CELL

Placido M. Spaziante, and Carlo Traini, both of Milan, Italy, assignors to Parel Societe Anonyme, Luxembourg, Luxembourg

Filed May 27, 1975, Ser. No. 580,691
Claims priority, application United Kingdom, May 30, 1974, 24077/74
Int. Cl.² C25D 5/04, 17/12
U.S. Cl. 204—23 14 Claims



1. An electrochemical apparatus which includes at least two electrochemical cells separated from ech other by an impermeable bipolar means having a plate-like portion which defines a boundary between an electrode compartment of a first polarity in one of the electrochemical cells and an electrode compartment of an opposite polarity in the other of the electrochemical cells, the bipolar means having at least a portion of one face thereof substantially planar, wherein each of said cells comprises at least one particulate electrode, a counter electrode and means for preventing an electrical short circuit between particles of the particulate electrode and the counter electrode, wherein the bipolar means provides an electrical connection between the particulate electrode of one cell and the counter electrode of the other cell, and wherein at least the substantially planar portion of said one face of the bipolar means is in electrical contact with the particulate electrode and is a current feeder for the particulate electrode.

4,019,969

METHOD OF MANUFACTURING CATALYTIC TUBES WITH WALL-SUPPORTED CATALYST, PARTICULARLY FOR STEAM REFORMING OF HYDROCARBONS AND METHANATION

Andrzej Golebiowski; Stanislawa Paluch; Zdzislaw Janecki; Alfred Polanski; Waclaw Hennel, all of Pulawy; Jerzy Zielinski, Warszawa; Cezary Warzec, Warszawa, and Wojciech Lisowski, Warszawa, all of Poland, assignors to Instytut Nawozow Sztucznych, Pulawy, Poland

Filed Nov. 17, 1975, Ser. No. 633,018
Int. Cl.² C25D 5/50, 7/04
U.S. Cl. 204—26 17 Claims

1. A method of manufacturing a catalytic tube with wall-supported catalyst particularly for steam reforming of hydrocarbons and methanation, comprising depositing a porous coating of metal sponge on the tube surface by electrolysis, impregnating the sponge with aqueous solutions of salts which after roasting yield metal oxides irreducible in the presence of hydrogen and of salts, which yield reducible metal oxides, and roasting the impregnated sponge coated tube to form metal oxides deposited in said metal sponge.

4,019,970

PROCESS FOR MAKING TITANIUM-SUPPORTED LEAD ELECTRODE

Heinz Peter Fritz; Dietrich Wabner, both of Munich, and Rainer Huss, Augsburg-Hochzoll, all of Germany, assignors to Rheinisch-Westfalisches-Elektrizitatswerk Aktiengesellschaft, Essen, Germany

Filed Sept. 16, 1975, Ser. No. 613,797
Claims priority, application Germany, Sept. 18, 1974, 2444691
Int. Cl.² C25B 1/30
U.S. Cl. 204—32 R 6 Claims

1. A process for making an electrode containing lead oxide as an active material, comprising the steps of:

a. immersing a body of titanium in a hot aqueous solution of oxalic acid for cleansing said body;

b. adsorptively coating the cleansed titanium body with a layer of titanium (IV) by immersing said body for a prolonged period in a treatment bath consisting essentially of a boiling aqueous solution of a Ti(IV) salt of ethylenediaminetetraacetic acid; and

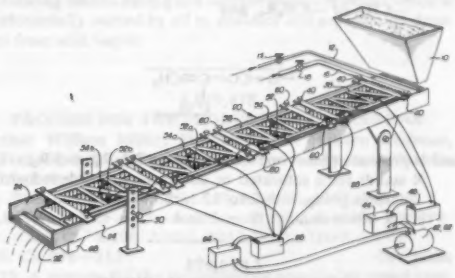
c. anodically coating the titanium body, treated in step (b), with PbO_2 in an electrolyte containing Pb(II) ions.

4,019,971

METHOD OF RECOVERING FINE GOLD FROM ORE

Virgil C. Crites, Tustin, Calif., assignor to Peter J. Bonin, Tustin, Calif.

Filed Sept. 22, 1975, Ser. No. 615,623
Int. Cl.² C25C 1/22
U.S. Cl. 204—130 9 Claims



1. In the amalgamation process for recovering precious metal wherein ore containing particles of a precious metal which form a mercury-metal amalgam upon contact of clean metal with clean mercury is passed in water ore pulp over one or more mercury coated amalgamating plates to thereby cause such precious metal particles to contact and adhere to the mercury coating by amalgamation, the improvement comprising inhibiting flouring of mercury for the amalgamating plates by creating an electric field between at least one electrode charged relative to a positively charged metal surface, and passing the pulp over the positively charged metal surface before the pulp is passed over the amalgamating plate, whereby the pulp passes through the electric field between the positively charged metal surface and the negatively charged electrode.

4,019,972
PHOTOPOLYMERIZABLE COPYING COMPOSITIONS CONTAINING BIURET-BASED POLYFUNCTIONAL MONOMERS

Raimund Josef Faust, Wiesbaden-Biebrich, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Dec. 2, 1974, Ser. No. 528,836

Claims priority, application Germany, Dec. 7, 1973, 2361041

Int. Cl.² C08F 8/00; C08G 18/00

U.S. Cl. 204—159.15 **12 Claims**

1. A photopolymerizable copying composition comprising at least one binder, at least one photoinitiator, and at least one polymerizable acid amide group-containing acrylic acid derivative or alkyl acrylic acid derivative which is not volatile at 100° C and contains at least three polymerizable unsaturated groups in the molecule, the polymerizable compound containing at least one compound of the following general formula

$$A\,(-X-NH-CO-G)_p$$

wherein:

A stands for $-N(-CO-NH-)_2$

G stands for

$$-C(=CH_2)-C_nH_{2n+1}, \quad -O-CH_2-C_mH_{2m}-O-CO-C(=CH_2)-C_nH_{2n+1},$$

or

$$-O(-CH_2-CH_2-O-)_k-CH_2-C(-R_1)(-R_2)-CH_2-R_3,$$

wherein

n is 0, 1, or 2,

m is a whole number from 1 to 11,

k is 0 or a whole number from 1 to 4,

R_1 is alkyl with 1 to 3 carbon atoms, or $-R_4$ or $-CH_2-R_4$

R_4 and R_3, which may be the same or different, are $-H$, $-CH_3$, or $-CH_2R_4$, and

R_4 is

$$-O-CO-C(=CH_2)-C_nH_{2n+1}$$

and is present at least one of the groups R_1, R_2, and R_3,

X stands for a saturated or unsaturated bi-valent hydrocarbon group with 2 to 12 carbon atoms, and

p is a whole number from 2 to 4.

4,019,973
CRUST-BREAKING MACHINE

Rolf Natvik, Ovre Ardal, and Rolf Rådahl, Rakkestad, both of Norway, assignors to A/S Ardal og Sunndal Verk, Oslo, Norway

Filed Dec. 18, 1975, Ser. No. 641,924

Claims priority, application Norway, Aug. 27, 1975, 752948

Int. Cl.² C25D 21/00, 21/12

U.S. Cl. 204—194 **4 Claims**

1. A crust-breaking machine comprising:

a self-propelled carriage having front wheels, rear wheels and a driver's seat;

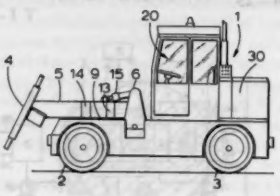
a column mounted on said carriage at a position between said front and rear wheels and in front of said driver's seat;

a support arm connected at a first end thereof to said column;

a crust-breaking tool of the continuously breaking type supported at a second end of said support arm;

means, connected to said support arm, for selectively moving said support arm and said crust-breaking tool in a vertical plane;

means, operatively connected to said column, for selectively rotating said column about a vertical axis and for thereby moving said support arm and said crust-breaking



tool in a horizontal plane between first and second working positions on opposite lateral sides of said carriage and a rest position extending forwardly of said carriage; and

support cradle means, positioned at each of said first and second working positions, for supporting said support arm and transferring stresses imparted thereto by said crust-breaking tool to said carriage while reducing transfer of such stresses to said column.

4,019,974
ELECTROCHEMICAL SENSOR CONSTRUCTION

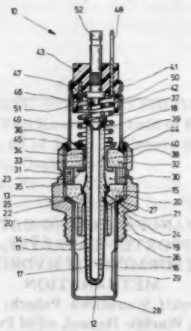
Helmut Weyl, Schwieberdingen, and Leo Steinke, Waiblingen-Hegnach, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Dec. 23, 1975, Ser. No. 643,934

Claims priority, application Germany, Feb. 1, 1975, 2504206

Int. Cl.² G01N 27/46

U.S. Cl. 204—195 S **17 Claims**



1. Electrochemical sensor construction to determine the oxygen content of gases having a solid electrolyte tube (11) closed at one end (12);

an electron conductive porous layer (14) at the outside of the tube covering at least part of the surface exposed to the gases;

a first connecting terminal (48) in electrically conductive connection with the conductive layer (14);

an inner conductor (17) on the inside of the tube, and in contact with the inside surface thereof;

a second connecting terminal (52) in electrically conductive connection with the inner conductor (17);

an electrically conductive housing (24, 41) concentrically surrounding the tube and formed to permit ingress of air

interiorly of the tube while exposing the outside thereof to the gases, and retaining said terminals in insulated relation with respect thereto;

wherein the solid electrolyte tube (11) is formed with a shoulder (13);

a first electrically insulating spacer ring (20) spacing the shoulder from the housing (24);

a conductive resilient sealing mass (30) in contact with the conductive layer (14) of the solid electrolyte tube (11);

an insulating sealing mass (31) surrounding the conductive sealing mass (30) and spacing the conductive sealing mass (30) from the housing (24, 41) to electrically insulate the conductive sealing mass, and hence the conductive layer (14) with respect to the housing;

a conductive element (34) surrounding the tube and bearing against the electrically conductive sealing mass (30);

first conductive means (37) contacting the conductive element (34) and the first terminal (48);

second conductive means (50) in contact with the inner conductor (17) in the interior of the tube and the second terminal (52);

and an insulating terminal block (43) closing off the housing (24, 41), the connecting terminals (48, 52) being secured in and passing through said terminal block to provide electrically and mechanically accessible terminals to the conductive layer (14) and the second conductor (17) and to electrically insulate the tube, and its terminals from the housing (24, 41).

4,019,975
HYDROGENATION OF COAL

Donald Bremner Urquhart, Cheltenham, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Oct. 29, 1974, Ser. No. 518,787

Claims priority, application United Kingdom, Nov. 8, 1973, 51930/73

Int. Cl.² C10G *1/08*

U.S. Cl. 208—10 **8 Claims**

1. A process for the hydrogenation of coal which comprises mixing the coal with an organic solvent having one or more utilizable solvent components, hydrogen, and a catalyst which is a salt or oxide of a non-noble metal,

maintaining the resulting mixture at a temperature above the critical temperature of the solvent and below 550° C whereby the solvent is in the aqueous phase and the sum of the reduced partial pressures of the solvent components is at least one, said catalyst being liquid or solid at said temperature,

separating the gaseous phase and residue, and

condensing hydrogenated products contained in the resulting separated gaseous phase therefrom.

4,019,976
PROCESS FOR HYDROGENATING HIGHLY CUTS UNSATURATED HEAVY HYDROCARBON

Jean Cosyns, Nanterre; Jean-Pierre Franck, Bougival; Jean-Claude Guibet, Le Vesinet, and Yves Jacquin, Sevres, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Apr. 21, 1975, Ser. No. 569,788

Claims priority, application France, Apr. 24, 1974, 74.14536

Int. Cl.² C10G *23/02*

U.S. Cl. 208—57 **16 Claims**

1. A process for hydrogenating an unsaturated heavy hydrocarbon cut containing at least 80% by weight of alkylaromatic, polyaromatic, indenic and/or alkenylaromatic hydrocarbons and boiling above 200° C under atmospheric pressure, comprising passing said cut in the presence of hydrogen over a first catalyst and then over a second catalyst, each catalyst containing an alumina carrier, at least one molybdenum and/or tungsten compound and at least one nickel and/or cobalt compound, the ratio

$$R = \frac{\text{Ni and/or Co}}{\text{W and/or Mo}},$$

in which the proportions are expressed in gram-atoms of metals, being from 1.5 : 1 to 10 : 1 for the first catalyst and from 0.1 : 1 to 1 : 1 for the second catalyst, and the alumina carrier of the first catalyst having a heat of neutralization by ammonia absorption lower than 10 calories per gram at 320° C under an ammonia pressure of 300 nm of mercury.

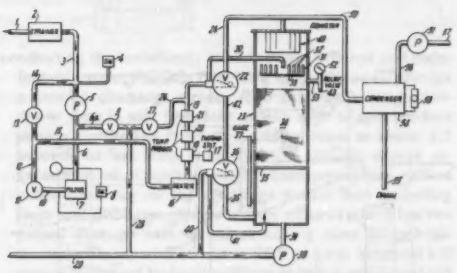
4,019,977
DEMISTER-COALESCER IN A PROCESS FOR REMOVING WATER FROM OIL

Robert Haig Hachadoorian, Great Neck, and Mark Lincoln Shyman, Kings Park, both of N.Y., assignors to Aquanetics, Inc., Long Island, N.Y.

Continuation-in-part of Ser. No. 505,977, Sept. 16, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,354

Int. Cl.² C10G *33/06*

U.S. Cl. 208—188 **1 Claim**



1. In a process for removing water from oil by passing a mixture of oil having both free and dissolved water contained therein over a dispersing material contained in a vessel and subjecting said dispersed mixture within said vessel to pressure lower than the vapor pressure of the water within said mixture whereby said water is vaporized into vapor, the improvement which comprises, passing said vapor through demisting-coalescing means having low surface energy material which is preferentially wetted by oil to coalesce and separate oil droplets from said vapor.

4,019,978
PROCESS FOR THE PRODUCTION OF ALUMINA

Arthur William Miller, Frodsham, and William Atkinson, Penketh, both of England, assignors to Laporte Industries Limited, London, England

Division of Ser. No. 284,540, Aug. 29, 1972, Pat. No. 3,864,461. This application Nov. 4, 1974, Ser. No. 520,999

Int. Cl.² C10G *23/02*; B01J *23/76, 23/48, 21/04*

U.S. Cl. 208—213 **10 Claims**

10. A process for the production of an alumina based catalyst comprising the steps of:

a. forming an aqueous solution of aluminum sulphate having a concentration of at least 2% by weight calculated as Al_2O_3.

b. forming an aqueous solution of sodium aluminate having a concentration of from 2% to 7% by weight calculated as Al_2O_3.

c. forming a mixture of the solutions formed in stages (a) and (b) to precipitate hydrous alumina in the form of a slurry having a concentration of from 2% to 7% by weight, by introducing the sodium aluminate solution into the aluminum sulfate solution until the mixture reaches a composition of from 10% excess aluminum sulphate to 10% excess sodium aluminate and wherein the addition takes place with sufficient agitation over a period of

about 1 minute to 5 hours until the mixture has a pH of from 7.3 to 10.0 to precipitate at least half of the hydrous alumina under acidic conditions while maintaining the mixture at a temperature in the range 12° to 35° C or in the range of 45° to 75° C.

d. separating the hydrous alumina from its mother liquor and washing the separated hydrous alumina.

e. impregnating the hydrous alumina from step (d) with at least one compound of at least one metal selected from Group Ib, VIa and VIII, and

f. calcining the treated hydrous alumina at a temperature above 400° C.

4,019,979

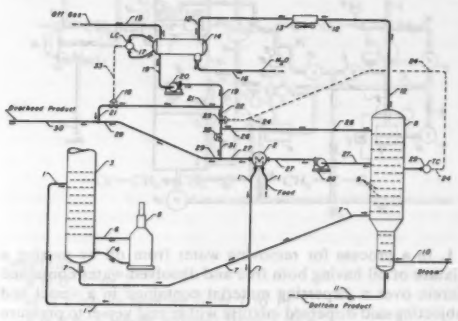
FRACTIONATION OF HYDROCARBONS

John P. Nolley, Jr., Glendale Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Mar. 19, 1976, Ser. No. 668,545

Int. Cl.² C10G 7/00

U.S. Cl. 208—353 **1 Claim**



1. A process for fractionating hydrocarbons which comprises the steps of:

a. passing a feed stream into a fractionation column at a first intermediate point while the fractionation column is operated at conditions effective to cause the fractionation of the feed stream;

b. withdrawing a bottoms product stream from the fractionation column;

c. withdrawing an overhead vapor stream from the fractionation column, passing the overhead vapor stream through a condensing means, and passing a resultant mixed phase hydrocarbon stream into an overhead receiver;

d. removing a liquid hydrocarbon stream from the overhead receiver and dividing the liquid hydrocarbon stream into a first aliquot portion and a second aliquot portion;

e. removing a liquid sidecut stream from the fractionation column at a second intermediate point located above the first intermediate point;

f. heat exchanging the liquid sidecut stream and effecting the removal of heat therefrom, and dividing the liquid sidecut stream into a first aliquot portion and a second aliquot portion;

g. admixing the first portion of the liquid hydrocarbon stream with the first portion of the liquid sidecut stream, and passing the resultant admixture into the fractionation column as a reflux stream; and,

h. admixing the second portion of the liquid hydrocarbon stream with the second portion of the liquid sidecut stream and removing the resultant admixture as a product stream of the fractionation column.

4,019,980

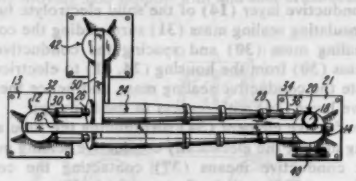
MULTIPLE HYDROCYCLONE ARRANGEMENT

James P. Beery, Springfield, Ohio, assignor to The Bauer Bros. Co., Springfield, Ohio

Filed Jan. 24, 1975, Ser. No. 543,868

Int. Cl.² B04C 5/28

U.S. Cl. 209—211 **21 Claims**



1. A cleaner system comprising a first pipe-like conduit, a second pipe-like conduit, at least one centrifugal cleaner including means defining an axially directed accepts outlet and means defining an axially directed rejects outlet, said means defining an axially directed accepts outlet being axially extended by means defining a tangential inlet to said first pipe-like conduit and said means defining an axially directed rejects outlet being axially extended by means defining a tangential inlet to said second pipe-like conduit, whereby to provide that the accepts and rejects enter the respective conduits in vortex flow pattens conducive, inherently, to the separation of constituents embodied therein, a second centrifugal cleaner positioned adjacent and in vertically offset generally parallel relation to said one cleaner having means defining an axially directed accepts outlet axially extended by means defining a tangential inlet to said first pipe-like conduit arranged to direct accepts to move into said first pipe-like concuit in a flow counter to that of the accepts directed interiorly of said first pipe-like conduit from said first-mentioned centrifugal cleaner and said second centrifugal cleaner further having means defining an axially directed rejects outlet axially extended by means defining a tangential inlet to said second pipe-like conduit.

4,019,981

METHOD AND APPARATUS FOR THE PREPARATION OF MINERAL MIXTURES ON A JIG CONTROLLED BY COMPRESSED AIR

Hanns Stern, Dortmund-Hoechsten, and Alexander Lotz, Wengern-Ruhr, both of Germany, assignors to Klöckner-Humboldt-Deutz Aktiengesellschaft, Germany

Continuation of Ser. No. 515,922, Oct. 18, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,607

Claims priority, application Germany, Oct. 20, 1973, 2352798

Int. Cl.² B03B 5/24

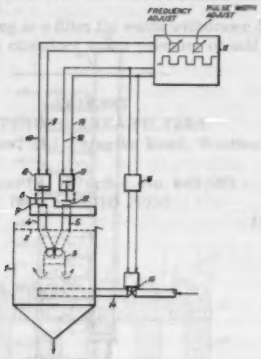
U.S. Cl. 209—455 **6 Claims**

1. In a method of preparing mineral mixtures wherein a separating liquid is moved upwardly and downwardly in a settling tank of a jig through the material supported on a perforate carrier by feeding compressed air into and venting an air chamber located within the settling tank to cause up and down pulsation of the liquid, the chamber having air feed and vent lines, and wherein the tank has a separating liquid feed line with a valve therein to introduce separating liquid into the tank, the improvement comprising the steps of:

generating electrical pulses corresponding to the desired up and down movement of the liquids:

applying the electrical pulses to valve control mechanisms of feed and vent valves in the feed and vent valves in accordance with a predetermined time sequence; and

opening the separating liquid valve after opening of the vent



valve to introduce separating liquid and retard the settling of separating liquid downwardly through the material.

4,019,982

METHOD FOR TREATMENT OF WASTE WATER CONTAINING ORGANIC POLLUTANTS

Yoshikatsu Ikari, Narashino; Shoichiro Yokoyama, Tokyo; Hideharu Yokoi, and Tatsuo Murakami, both of Kamiichi, all of Japan, assignors to Agency of Industrial Science & Technology, Chiyoda and Fuji Chemical Industry Co., Ltd., Toyama, both of, Japan

Filed May 29, 1975, Ser. No. 581,941

Claims priority, application Japan, May 31, 1974, 49-61633

Int. Cl.² C02C 5/02

U.S. Cl. 210—30 R 6 Claims

1. A process for removing colored soluble organic pollutants from waste water which comprises mixing with said waste water a solid product prepared by the process which comprises mixing an aqueous aluminum solution with an aqueous solution of a calcium or magnesium, adjusting the pH of the resulting mixture to a value greater than 8, whereby the metallic components react with each other and a gel precititates; separating the precipitated gel from the reaction mixture and then drying the gel; the mixing ratio of said aqueous solutions being chosen such that when said aqueous calcium solution is mixed with said aqueous aluminum solution, the aluminum content of the gel calculated as Al_2O_3, is in the range of from about 30 to 60% by wt. and the calcium content of the gel, calculated as CaO, is in the range of from about 10 to 25% by wt., and when said aqueous magnesium solution is mixed with said aqueous aluminum solution, the aluminum content of the gel, calculated as Al_2O_3, is in the range of from about 15 to 30% wt.% and the magnesium content of the gel, calculated as MgO, is in the range of from about 20 to 40 wt.%.

4,019,983

DISINFECTION SYSTEM AND METHOD

Mikkel G. Mandt, Prophetstown, Ill., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

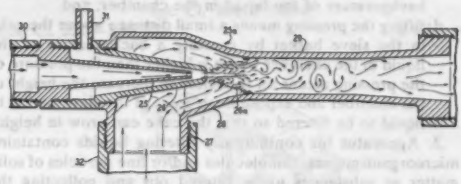
Continuation-in-part of Ser. No. 513,724, Oct. 10, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,872

Int. Cl.² C02B 1/36; B01F 3/04

U.S. Cl. 210—62 9 Claims

1. A rapid and efficient method for disinfecting sewage effluent, comprising the steps of

continuously mixing and passing sewage effluent having pretreatment biological values to be disinfected and an effective sewage treatment disinfectant dose level of a fluid disinfectant through a turbulent mixing zone while maintaining a turbulent energy dissipation level in the turbulent mixing zone such that the mixing rate in the mixing zone is at least about 5 seconds^{-1} to provide a turbulently mixed product stream having a substantially uniform toxic environment for organism inactivation, said turbulent mixing zone being produced by introducing at least one motive stream of a minor portion of the sewage effluent to be treated into an induction zone which is supplied with the major portion of the sewage effluent to be treated, wherein the ratio of the volumetric rate of induction of sewage effluent from the induction zone into the turbulent mixing zone to the volumetric flow rate of the motive stream is in the range of about 1.4:1 to about 23:1 and wherein the velocity of the motive stream introduced into the induction zone is at least about 17 feet per second,



conducting the turbulently mixed sewage effluent and disinfectant product stream from said mixing zone to provide a treated discharge stream such that the average residence time in said turbulent mixing zone of said product stream conducted from said mixing zone is about 1.5 seconds or less while maintaining a specific energy requirement of at least about 0.2 horsepower per million gallons per day of the discharge stream and excluding from said discharge stream sewage effluent which has not passed through said turbulent mixing zone to provide treated effluent with at least a 99.9 percent bacterial kill rate as measured by fecal coliform removal and a viral kill rate of at least 99 percent as measured by f_2 virus removal.

4,019,984

CONTINUOUS FILTER WITH PRESSING MEANS

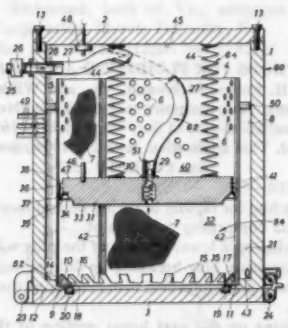
Helmuth Mohn, Dutenhofen, Germany, assignor to Gesellschaft fur Strahlen- und Umweltforschung mbH, Munich, Germany

Filed Apr. 14, 1975, Ser. No. 568,128

Claims priority, application Germany, Apr. 13, 1974, 2418189

Int. Cl.² B01D 37/04; C02B 3/02

U.S. Cl. 210—66 21 Claims



1. Method for continuously filtering liquids containing microorganisms, macromolecules and/or fine particles of solid material as substances to be filtered out and collecting the substances that are filtered out in the form of a filter cake formed within an upright sieve basket, comprising:

a. introducing liquid to be filtered into the top of a chamber within the upright sieve basket, said chamber being defined by a pressing means and a lower portion of said sieve basket where the filtrate is separated from the substances to be filtered out;

b. continuously exerting pressure on the liquid in the sieve basket during step (a) by the pressing means so that the filtrate leaves the sieve basket and the entire top surface of the cake formed in the sieve basket from the filtered-out substances, at any given time, always has approximately a uniform height;

c. increasing the pressure at which the liquid to be filtered is introduced into the chamber in response to build-up of the cake within the chamber and thereby increase the backpressure of the liquid in the chamber; and

d. lifting the pressing means a small distance above the cake in the sieve basket by creating a backpressure of the liquid in the chamber which is higher than the pressure of the pressing means on the liquid to increase the height of the chamber and expose fresh areas of the sieve basket to liquid to be filtered so that the cake can grow in height.

3. Apparatus for continuously filtering liquids containing microorganisms, macromolecules and/or fine particles of solid matter as substances to be filtered out and collecting the substance comprising:

a. a housing having a shell, a bottom cover closing the bottom of the shell, and a top cover closing the top of the shell,

b. a sieve basket mounted in the housing for receiving the liquid to be filtered in the interior of the sieve basket, the sieve basket being open at its top and bottom and situated at the bottom of the housing, the sieve basket forming a filtrate chamber with the housing,

c. an axially movable disc mounted in the sieve basket and dividing the interior of the sieve basket into a lower chamber which receives the liquid to be filtered and an upper chamber which is sealed from the lower chamber, said disc having a bore for passage of the liquid to be filtered into the lower chamber,

d. an inlet line entering into and mounted in the housing, said inlet being connected to the bore for bringing the liquid to be filtered into the lower chamber of the sieve basket through the bore; and

e. force applying means within the upper chamber acting on the disc which together with the disc comprises a pressing means which exerts pressure on the liquid in the lower chamber of the sieve basket.

4,019,985

METHODS FOR FLUIDIZING A FILTER MEDIA

Matthew H. Fuller, Richmond, Va., and William R. Deever, Beaumont, Tex., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 600,259, July 30, 1975, abandoned. This application June 17, 1976, Ser. No. 697,292

Int. Cl.² B01D *23/24*

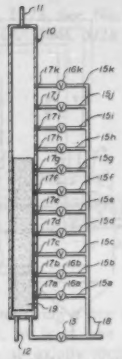
U.S. Cl. 210—80 **12 Claims**

1. A method for rapidly breaking up and fluidizing a plug of filter media comprising the steps of,

a. breaking up a lower portion of the plug with a horizontal high pressure plug-breaking-up fluid jet injecting into the plug at a predetermined distance above the bottom of the plug,

b. breaking up the next lower portion of the plug with a horizontal high pressure a plug-breaking-up fluid jet injecting into the plug at a predetermined distance above the previous horizontal plug-breaking-up fluid jet, and

c. continuing the breking up of successive and consecutive next lower portions of the plug with successive and consecutive horizontal high pressure plug-breaking-up fluid jets, each fluid jet injecting into the plug at a predetermined distance above the last horizontal high pressure



plug-breaking-up fluid jet until all of the plug is broken up for rapidly breaking up and fluidizing a filter media plug.

4,019,986

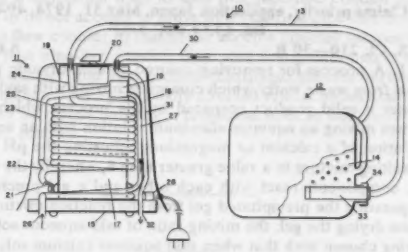
PORTABLE WATER PURIFIER

William Alan Burris, 7 E.Jefferson Circle, Pittsford, N.Y. 14634, and Charles A. Beaman, 2 Beaman Road, Rochester, N.Y. 14624

Filed June 11, 1973, Ser. No. 368,702

Int. Cl.² C02B *1/38*

U.S. Cl. 210—139 **14 Claims**



1. A portable water purifier comprising:

a. a portable ozone generator;

b. a portable water container independently positionable relative to said generator;

c. a flexible tube leading from said generator to said container to conduct ozone to said container;

d. a manually disconnectable connection joining said flexible tube to said generator;

e. a filter connected to the end of said flexible tube opposite said disconnectable connection;

f. means for connecting said filter to said portable water container;

g. said portable water container being orientable for disposing said filter in a lower region of said portable water container so said filter serves as a bubbler for bubbling said ozone into said lower region of the water in said container;

h. vent means for venting gas from said portable water container;

i. said vent means having an ozone decomposition catalyst arranged so said gas vented through vent means passes through said catalyst to decompose any ozone in said vented gas;

j. said flexible tube serving as a water output line from said portable water container after ozone treatment of said water;

k. said flexible tube being arranged as a siphon for providing a pressure head for drawing said purified water from said container; and

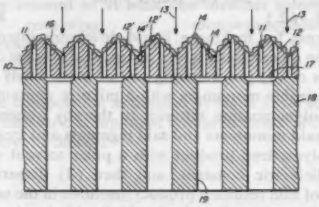
l. said filter serving as a filter for water withdrawn from said portable water container under pressure of said siphon.

4,019,987

EXTENDED AREA FILTERS

Leonard L. Krasnow, 293 Turnpike Road, Westboro, Mass. 01581

Filed Jan. 14, 1976, Ser. No. 649,052
Int. Cl.² B01D *29/00*
U.S. Cl. 210—232 **11 Claims**



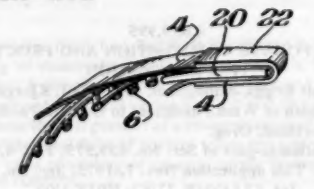
1. In an apparatus to filter a fluid material under high pressure in the range of 10,000 pounds per square inch or greater, said apparatus including means defining a passage through which said material is forced to flow under such high pressure, extended-area filter means located in the path of said flow comprising a rigid breaker plate across said passage in a principal plane which is essentially the same as a right-cross section of said flow, said plate having a rigid corrugated surface extending across said passage for confronting oncoming high pressure flow with an enlarged filter area that is substantially two times larger than the plane area of said principal plane contained within the bounds of said passage, means providing a plurality of holes through said breaker plate and said corrugated surface for passage therethrough of filtered material, screen means removably supported on said corrugated surface, said screen means comprising at least one primarily two-dimensional screen made of a shape-retaining material and having substantially permanently fixed therein a corrugated shape configuration that corresponds substantially identically to the shape-configuration of said rigid corrugated surface, said plate giving substantially uniform support throughout said enlarged filter area to said screen means against said high pressure for preventing collapse of said screen means during the intended operation of said apparatus.

4,019,988

DIALYZER MEMBRANE SEAL AND TUBING CONNECTOR

Lloyd L. Ziegler, Collegeville, Pa., assignor to Extracorporeal Medical specialities Inc., King of Prussia, Pa.

Filed Aug. 28, 1975, Ser. No. 608,627
Int. Cl.² B01D *29/06, 13/00*
U.S. Cl. 210—494 R **9 Claims**



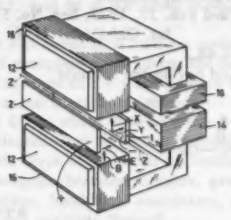
1. In a dialyzer coil comprising a core with permeable tubing and support material spirally wound thereon, blood inlet and outlet assemblies secured to the permeable tubing and a tubing clamp extending the length of at least one end of said permeable tubing to mechanically seal said tubing and secure it to the support material to promote transfer of the fluid weight in said tubing to the support material.

4,019,989

WIEN FILTER

Nicolaas Hazewindus, and Jacob Maria van Nieuwland, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,579
Claims priority, application Netherlands, Nov. 25, 1974, 7415318
Int. Cl.² H01J *39/36*
U.S. Cl. 250—396 ML **5 Claims**



1. A Wien filter for selecting particles having a given velocity from a beam of charged particles and comprising means to maintain an electric field and a magnetic field, which fields extend substantially at right angles to each other and extend each substantially at right angles of the axis of the said beam, which magnetic field is produced between the poleshoes of an electromagnet which has means to provide an adjustable gradient in the said magnetic field, said gradient being substantially parallel to the electric field, characterized in that the means producing the said gradient comprise two coils which are present on either side of the said beam and the axis of which extend substantially parallel to the electric field, the magnetic field strengths generated in the coils being directed substantially opposite to each other.

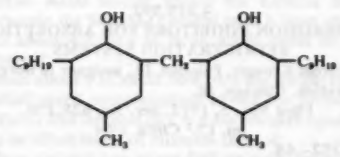
4,019,990

PRODUCTION OF POLYESTER TIRE YARN POLYGLYCOL ETHER SPIN FINISH COMPOSITION

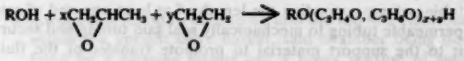
Robert Moore Marshall, Chester, and Kimon Constantine Dardoufas, Richmond, both of Va., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed July 23, 1975, Ser. No. 598,465
Int. Cl.² D06M *15/10*
U.S. Cl. 252—8.9 **1 Claim**

1. A finish composition for yarn consisting essentially of about 0.5 to 3 parts by weight of an antioxidant compound having the formula:



and about 97 to 99.5 parts by weight of a polyalkylene glycol compound which is a mixed polyoxyethylatedpolyoxypropylated monoether prepared in accordance with the equation



where R is an alkyl group having 3 to 5 carbon atoms, *x* and *y* are the number of moles of propylene oxide and ethylene oxide, respectively, and wherein ethylene oxide comprises 40 to 60 percent of the combined total of ethylene oxide and propylene oxide and $x + y$ has a value to produce a molecular weight of from 300 to 1,000.

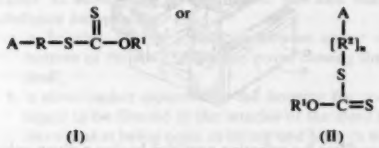
4,019,991

SULPHUR CONTAINING LUBRICATING OIL ADDITIVES

Gerald John Joseph Jayne, and Herbert Frank Askew, both of Bracknell, England, assignors to Edwin Cooper & Company Limited, Bracknell, England

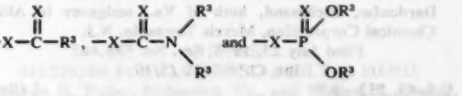
Filed Feb. 27, 1975, Ser. No. 553,738
Int. Cl.² C10M *1/38*
U.S. Cl. 252—48.2 **27 Claims**

1. compound having the formula:



(I) (II)

wherein in Formula (I) R is a sulfur-bridged hydrocarbon ring derived from 1,3,5-cycloheptatriene or 1,5,9-cyclododecatriene, said sulfur-bridge being a single sulfur bridge between two non-adjacent carbon atoms of said ring forming a bicyclo compound and wherein in Formula (II) R^2 is a polymer comprising the residue of a plurality of *n* hydrocarbon rings which are derived from 1,3,5-cycloheptatriene, cyclooctatetrene, 1,3-cyclooctadiene, 1,5-cyclooctadiene, 3-alkoxy derivatives thereof and 1,5,9-cyclododecatriene, said *n* hydrocarbon rings being connected through a sulfur bridge, *n* being the degree of polymerization such that said compound is oil-soluble, R^1 is the same or different and is an alkyl, alkenyl or aralkyl group and A is a nucleophyllic group selected from



wherein R^1 is as above, X is oxygen or sulfur and R^3 is alkyl, aryl, alkaryl or aralkyl.

4,019,992

CORROSION INHIBITORS FOR ABSORPTION REFRIGERATION SYSTEMS

Robert Harold Krueger, Palatine, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 3, 1975, Ser. No. 628,270
Int. Cl.² C09K *5/04*
U.S. Cl. 252—68 **2 Claims**

1. An anhydrous working fluid composition for use in absorption refrigeration systems comprising from 52 to 25% by weight alcohol, and from 48 to 75% by weight of a 2/1 mole ratio lithium bromide/zinc bromide mixture and from 0.2 to about 1% by weight based on said working fluid of a 1:1 mixture of the sodium salt of ethylenediamine tetraacetic acid and arsenic trioxide.

4,019,993

MANUFACTURING PROCESS FOR LIQUID DEVELOPER

Yasuo Tamai; Sadao Osawa, and Satoru Honjo, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 20, 1971, Ser. No. 191,078
Claims priority, application Japan, Oct. 21, 1970, 45-92660
Int. Cl.² G03G *9/00*
U.S. Cl. 252—62.1 **8 Claims**

1. A process for making a liquid developer intended for developing an electrostatic latent image, said process comprising the steps of (1) polymerizing one or more kinds of addition-polymerizable monomers with a mixture containing pigment and polymerization initiator to thereby obtain a graft polymer of said monomers and said pigments and treating the resultant polymerized product with a polar solvent of 12 or higher in dielectric constant, and then (2) dispersing the component of said resultant product insoluble in the said polar solvent in the carrier liquid of said liquid developer, said carrier liquid having high electric resistance and being selected from the group consisting of aliphatic hydrocarbon solvents, alicyclic hydrocarbon solvents, silicone, oil, and fluoro chloro hydrocarbon solvents whereby (a) the electric resistance of said developer, (b) the uniformity of the charge of the toner in the developer, and (c) the length of charge stability are enhanced because of said treating step.

4,019,994

PROCESS FOR THE PREPARATION OF AQUEOUS MAGNETIC MATERIAL SUSPENSIONS

Jack R. Kelley, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed Aug. 28, 1975, Ser. No. 608,463
Int. Cl.² G01N *27/82*; H01F *1/00*
U.S. Cl. 252—62.52 **15 Claims**

1. A process for the preparation of magnetic fluid of a suspension of a ferromagnetic iron material in an aqueous medium which comprises mixing a petroleum sulfonate in the aqueous medium, dissolving an iron compound in the aqueous medium, adding an alkali to the aqueous medium, and reacting the mixture at a pH in the range of 5.5 to 8 to form magnetic iron oxide or magnetic hydroxyoxide, said iron being present in the aqueous medium as ferric and ferrous forms, and said petroleum sulfonate being mixed in an amount sufficient to disperse the iron oxide or iron hydroxide.

4,019,995

LIGNOSULFONATE COMPOSITION AND PROCESS FOR ITS PREPARATION

William Scott Briggs, Bellingham, and Niels J. Kjargaard, Oak Harbor, both of Wash., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Continuation-in-part of Ser. No. 439,579, Feb. 4, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 630,071
Int. Cl.² G01N *27/82*; H01F *1/00*
U.S. Cl. 252—62.53 **31 Claims**

1. A composition comprising a material selected from the group consisting of lignosulfonate and sulfonated tannin combined with iron, said composition being ferromagnetic.

4,019,996

DIELECTRIC COMPOSITIONS

Pierre Jay, St.-Didier du Mont d'Or, and Ghislain Schwachhofer, Miribel, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed July 7, 1975, Ser. No. 593,304

Claims priority, application France, July 16, 1974, 74.25788; Dec. 3, 1974, 74.40725; May 28, 1975, 75.17209

Int. Cl.² H01B *3/18, 3/22*

U.S. Cl. 252—63.7 11 Claims

1. A dielectric composition comprising a liquid dielectric component selected from the group consisting of mineral oil, castor oil, chlorodiphenyls, aromatic hydrocarbons and alkylates thereof, and esters of organic acids and containing an effective amount of at least one member selected from the group consisting of monocyanophenoxybenzene, monocyanodiphenyl and monocyanoterphenyl to impart the desired permittivity characteristic to said dielectric composition.

2. The composition as defined by claim 13, wherein the said second dielectric component comprises from about 3 percent to 50 percent thereof.

4,019,997

SILICONE FLUID USEFUL AS A BRAE FLUID

Edgar D. Brown, Jr., Schenectady, and Frank J. Traver, Troy, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Continuation-in-part of Ser. No. 439,388, Feb. 4, 1974, abandoned, which is a division of Ser. No. 290,075, Sept. 18, 1972, abandoned. This application Jan. 13, 1976, Ser. No. 648,692

Int. Cl.² C10M *3/48, 3/44*

U.S. Cl. 252—78.3 8 Claims

1. A process for transmitting force through a hydraulic system having hydraulic activating means, hydraulic activated means and hydraulic line means connecting said hydraulic activating means with said hydraulic activated means comprising substantially filling said hydraulic activating means, said hydraulic activated means and said hydraulic lines with a hydraulic fluid mixture having an acceptable water tolerance comprising a linear silicone hydraulic fluid of the formula,

where *n* varies from 1 to 2,000, R is selected from the class consisting of monovalent hydrocarbon radicals, halogenated monovalent hydrocarbon radicals and cyanoalkyl radicals and the viscosity of said fluid varies from 20 to 500 centistokes at 25° C where there is present at a concentration of 1 to 60% by weight of the total fluid of a water tolerance additive selected from the class consisting of an ester of the formula,

$R_x^5 B(OR^{5a\ 6})_{3-x}$

and partially hydrolyzed products of the foregoing ester where R^5 and R^6 are selected from the class consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, *e*is 1.

4,019,998

PROCESS FOR PREPARING A PYROPHOSPHATE-SILICATE DETERGENT PRODUCT

Richard W. Benson, Cincinnati; Steven D. Cherney, Springdale, and Everett J. Collier, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 587,455, June 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 550,058, Feb. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 509,866, Sept. 27, 1974. This application Sept. 29, 1975, Ser. No. 618,303

Int. Cl.² C11D *3/06, 3/08, 3/12, 11/02*

U.S. Cl. 252—135 18 Claims

1. A detergent composition prepared by the process of:

1. forming an aqueous slurry comprising
   a. from about 2 to about 20% on a dry weight basis of an alkali metal silicate having the formula $SiO_2:M_2O$, wherein the $SiO_2:M_2O$ weight ratio is from about 2.4:1 to about 4:1, and M is an alkali metal or mixtures thereof;
   b. from about 9 to about 50% on a dry weight basis of an alkali metal pyrophosphate having the formula $M_xH_y(P_2O_7)$ and the sum of $x+y$ are integers equal to 4; M is an alkali metal or mixtures thereof;
   c. from about 0.1 to about 80% on a dry weight basis of a diluent selected from the group consisting of natural and synthetic clays, alkali metal carbonates, bicarbonates, and sesquicarbonates, borates, perborates, sulfates, chlorides, bisulfates, aluminates, and calcium carbonate, and mixtures thereof;
   d. from about 5 to about 40% on a dry weight basis of an anionic, nonionic, zwitterionic, or ampholytic detergent and mixtures thereof; then,
2. spray drying the slurry of (1) to form an alkaline solid granular detergent composition characterized in that when 1.2 grams of the alkaline solid granular detergent composition are added to one liter of distilled water at 25° C, agitated for one minute to avoid lumping, and filtered through a 142 mm diameter, five micron pore size filter under nitrogen at 6.8 atmospheres pressure, the molar ratio of the filtrate SiO_2 to the total SiO_2 from the silicate in the complete alkaline detergent composition is no more than about 3.3:4, and
3. admixing from about 0 to about 60% on a dry weight basis of the material described in (1)(b) to give a detergent composition combining from about 12% to about 45% by weight $M_4(P_2O_7)$ wherein M is an alkali metal;

wherein the total amount of alkali metal tripolyphosphate present is less than about 20% by weight of the total pyrophosphate present and wherein the total detergent composition contains from about 0.1% to about 4% by weight of a glassy phosphate of the formula

$(M_2O)_x(P_2O_5)_y$

wherein *y* is from about 5 to 50 and the ratio of y:x is from about 1:1 to about 1:1.5 and M is an alkali metal.

18. A process for forming a detergent composition comprising the steps of:

1. forming an aqueous slurry comprising
   a. from about 2 to about 20% on a dry weight basis of an alkali metal silicate having the formula $SiO_2:M_2O$, wherein the $SiO_2:M_2O$ weight ratio is from about 2.4:1 to about 4:1, and M is an alkali metal or mixtures thereof;
   b. from about 9 to about 50% on a dry weight basis of an alkali metal pyrophosphate having the formula $M_xH_y(P_2O_7)$ and the sum of $x+y$ are integers equal to 4; M is an alkali metal of mixtures thereof;
   c. from about 0.1 to about 80% on a dry weight basis of a diluent selected from the group consisting of natural and synthetic clays, alkali metal carbonates, bicarbonates, and sesquicarbonates, borates, perborates, sulfates, chlorides, bisulfates, aluminates, and calcium carbonate, and mixtures thereof;

d. from about 5 to about 40% on a dry weight basis of an anionic, nonionic, zwitterionic, or ampholytic detergent and mixtures thereof; then,

2. spray drying the slurry of (1) to form an alkaline solid granular detergent composition characterized in that when 1.2 grams of the alkaline solid granular detergent composition are added to one liter of distilled water at 25° C, agitated for one minute to avoid lumping, and filtered through a 142 mm diameter, five micron pore size filter under nitrogen at 6.8 atmospheres pressure, the molar ratio of the filtrate SiO_2 to the total SiO_2 from the silicate in the complete alkaline detergent composition is no more than about 3.3:4, and

3. admixing from about 0 to about 60% on a dry weight basis of the material described in (1)(b) to give a detergent composition containing from about 12 to about 45% by weight $M_4(P_2O_7)$ wherein M is an alkali metal;

wherein the total amount of alkali metal tripolyphosphate present is less than about 20% by weight of the total pyrophosphate present and wherein the total detergent composition contains from about 0.1 to about 4% by weight of a glassy phosphate of the formula

$$(M_2O)_x(P_2O_5)_y$$

wherein y is from about 5 to 50 and the ratio of y:x is from about 1:1 to about 1:1.5 and M is an alkali metal.

4,019,999

SPRAY-DRIED GRANULAR DETERGENT CONTAINING ALUMINOSILICATE, SILICATE, AND PYROPHOSPHATE

Tom H. Ohren, and Gary W. Kingry, both of Cincinnati, Ohio, assignors to The Procter & Gamble Co., Cincinnati, Ohio

Filed July 23, 1975, Ser. No. 598,292

Int. Cl.[2] C01B *33/28;* C11D *3/06, 3/12, 11/02*

U.S. Cl. 252—140 16 Claims

1. A spray-dried granular detergent product comprising:

a. from about 1% to about 40% by weight of an organic detergent component selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic detergents and mixtures thereof;

b. from about 3% to about 25% by weight of a water insoluble crystalling aluminoslicate ion exchange material of the formula

$$Na_{12}[AlO_2{\cdot}SiO_2]_{12}{\cdot}x\ H_2O$$

wherein x is an integer of from about 20 to about 30, said aluminosilicate having a particle size range of from about 0.2 micron to about 10 microns, having a calcium ion exchange capacity of at least about 200 mg. eq. $CaCO_3$/g. and an ion exchange rate with calcium of at least about 2 grains of calcium ion per gallon per minute per gram;

c. from about 5% by weight of alkali metal pyrophosphate;

d. from about 7% to about 25% by weight of an alkali metal silicate having the weight ratio SiO_2:M_2O of from about 2.0:1 to about 4.0:1 wherein M is sodium metal;

said product having a total free moisture content of from about 4.5% to about 7% by weight of the composition.

4,020,000

CONTROL OF CORROSION AND SCALE IN CIRCULATING WATER SYSTEMS BY MEANS OF PARTIAL ESTERS OF POLYFUNCTIONAL ORGANIC ACIDS

Tzeng Jiueq Suen, New Canaan; Arthur James Begala, Jr., Fairfield, and Martin Grayson, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 456,119, March 29, 1974, Pat. No. 3,974,083. This application Sept. 5, 1975, Ser. No. 610,808

Int. Cl.[2] C23F *11/10, 11/00;* C02B *5/06*

U.S. Cl. 252—180 5 Claims

1. An additive composition for inhibiting corrosion and scale on ferrous metal parts of a circulating water system by addition of said additive to said water in inhibiting amounts, said composition consisting essentially of a mixture of a) the partial ester condensation product of an alcohol having the formula

$$R(O{-}CH_2CH_2)_mOH$$

wherein

R is hydrocarbon having 8 to 20 carbon atoms and m is 2 to 4

with an acid selected from citric, malic, tartaric, succinic, adipic, phthalic and maleic acids, wherein one carboxyl group in said acid is unesterified, and b) from about one to about one-half part of a light hydrocarbon or vegetable oil per part of said condensation product and sufficient amount of a surfactant for dispersing said oil in water.

4,020,001

DIOL CURATIVE FOR POLYURETHANE

John R. White, Wadsworth, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 31, 1975, Ser. No. 563,434

Int. Cl.[2] C09K *3/00;* C08G *79/00*

U.S. Cl. 252—182 2 Claims

1. A polyol curative satisfactory for curing polyurethane reaction mixtures, said curative comprising ethylene glycol and a second diol selected from the class consisting of thio diethylene and the carbamates of diethanol, ethanol isopropanol and ethanol diethanol.

4,020,002

NON-SCHIFF BASE FIELD EFFECT LIQUID CRYSTAL COMPOSITION

Chan S. Oh, Diamond Bar, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 28, 1974, Ser. No. 446,806

Int. Cl.[2] C09K *3/34;* G02F *1/13*

U.S. Cl. 252—299 2 Claims

1. A liquid crystal composition for use in information transmission, storage, handling and display systems consisting essentially of two components; a solute consisting essentially of the strongly positive dielectric anisotropic nematic non-Schiff base compound 4′-cyanophenyl-4-n-heptylbenzoate; and a solvent consisting essentially of a composition of the weakly negative dielectric anisotropic nematic non-Schiff base compounds 4′-n-butylphenyl-4-n-hexyloxybenzoate, 4′-methoxyphenyl-4-n-heptylbenzoate, 4′-n-pentylphenyl-4-n-hexyloxybenzoate and 4′-n-pentylphenyl-3-chloro-4-(4′-n-pentylbenzoyloxy)-benzoate; the strongly positive dielectric anisotropic nematic solute comprising from about two percent to about fifty percent of the composition, the composition having a net positive dielectric anisotropy and exhibiting nematic behavior in the range encompassing normal room temperature and extending below and above normal room temperature and extending below and above normal room temperature to cover usual ambient operating temperatures, and exhibiting electro-optic behavior under nematic conditions within the range of from about 0.1 to about 20.0 volts at 0 to 10 kilohertz in a layer from about 6μ to about 25μ in thickness in an electro-optic display device which comprises the layer of nematic liquid crystal composition between spaced substrates which have electrically conductive elements for applying the voltage through the layer of liquid crystal composition.

4,020,003

FIXATION OF TRITIUM IN A HIGHLY STABLE POLYMER FORM

Meyer Steinberg, Huntington Station; Peter Colombo, Patchogue, and Jacob Pruzansky, E. Islip, all of N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 24, 1976, Ser. No. 660,909
Int. Cl.² G21F 9/16
U.S. Cl. 252—301.1 W 2 Claims

1. A method of fixing tritiated water comprising the steps of:
a. reacting said tritiated water and calcium carbide to produce tritiated calcium hydroxide and acetylene;
b. separating the calcium hydroxide from the acetylene;
c. polymerizing the acetylene to form polyacetylene; and
d. incorporating the polyacetylene in a solidfying matrix of cement and water.

4,020,004

CONVERSION OF RADIOACTIVE FERROCYANIDE COMPOUNDS TO IMMOBILE GLASSES

Wallace W. Schulz, and A. Louise Dressen, both of Richland, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 21, 1975, Ser. No. 634,224
Int. Cl.² G21F 9/34
U.S. Cl. 252—301.1 W 7 Claims

1. A method of converting solid radioactive ferrocyanide precipitates of the general formula $^{134\text{-}137}Cs_aM_b[FE(CN)_8]_c \cdot xH_2O$, where M represents Ni, Cu, Fe, Co, Cd, Mn or UO_2; *a*, *b*, and *c* are integers; and *x* is zero or a small number, to an insoluble silicate glass comprising the step of heating and melting said radioactive ferrocyanide in a charge consisting essentially of from 10 to 30 percent of said ferrocyanide and from 15 to 25 percent sodium carbonate and a mixture selected from the group consisting of (a) from 40 to 60 percent basalt and from 5 to 15 percent boron trioxide and (b) from 40 to 60 percent silica and from 5 to 10 percent calcium oxide.

4,020,005

GELLED REAGENT MATERIALS

John L. Lang, P.O. Box 1242, Midland, Mich. 48640

Continuation-in-part of Ser. No. 552,053, Feb. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 155,345, June 21, 1971, abandoned, which is a continuation-in-part of Ser. No. 734,553, June 5, 1968, abandoned, which is a continuation-in-part of Ser. No. 531,755, March 4, 1966, abandoned, which is a continuation-in-part of Ser. No. 242,910, Dec. 7, 1962, abandoned. This application Jan. 19, 1976, Ser. No. 650,454
Int. Cl.² B01J 13/00
U.S. Cl. 252—316 6 Claims

1. A shaped dimensionally-stable reagent material product of appropriate stoichiometrically proportionate compositions comprising at least one chemically active liquid reagent substance, said reagent substance being a part of a solidified gel phase, the primary gelling agent thereof consisting of a polymeric material capable of forming said gel in the presence of said liquid chemically active reagent substance and being non-deleterious with the reagent substance, and the gel being susceptible to de-gellation when said gelled reagent material product is subjected to exposure to the reaction medium in which said gelled reagent substance is intended to be employed.

4,020,006

FLUID CONTAINING DISPERSED PARTICLES SIMULATING LEUKOCYTES AND METHOD FOR PRODUCING SAME

James E. Parker, Long Beach, Calif., assignor to ICL/Scientific, Fountain Valley, Calif.

Filed Aug. 14, 1975, Ser. No. 604,614
Int. Cl.² G01N 33/16, 1/30; C09K 3/00
U.S. Cl. 252—408 11 Claims

1. In a method for preparing a standard body fluid for use as a control in clinical testing comprising the steps of introducing materials into a body fluid to bring the proportion of constituent components to a predetermined level followed by lyophilization to remove the liquid phase therefrom and adding liquid to reconstitute the lyophilized sample prior to its use, the improvement comprising:
introducing into said standard body fluid a predetermined amount of particles simulating leukocytes, said particles consisting of the microspores of plants selected from the group consisting of *Broussonetia papyrifera*, *Morus albus* and *Carya illinoensis*, said microspores having a particle size ranging between about 10 microns and about 25 microns and being reactive with a biological tissue staining compound for staining leukocytes to reveal a defined nucleus and cytoplasm.

4,020,007

CATALYST FOR PREPARATION OF POLYBUTADIENE

Floyd E. Naylor, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 463,978, April 25, 1974, Pat. No. 3,896,102. This application Apr. 28, 1975, Ser. No. 572,045
Int. Cl.² B01J 31/02
U.S. Cl. 252—429 B 5 Claims

1. A catalyst for polymerizing 1,3-butadiene to produce trans polybutadiene comprising:
a. an organoaluminum hydride represented by the general formula R_aAlH_b wherein R is alkyl, cycloalkyl or mixtures thereof containing from about 1 to 16 carbon atoms, a is an integer from 1 to 2, b is an integer from 1 to 2 such that the sum of a plus b equals 3;
b. an organolithium or organosodium compound represented by the general formula $R'M_x$ wherein x is an integer from 1 to 4, R' is a hydrocarbon radical selected from the group consisting of aliphatic and cycloaliphatic radicals containing from about 1 to 20 carbon atoms per radical and M is lithium or sodium;
c. a titanium halide component selected from the group consisting of titanium tetrachloride plus molecular iodine, titanium tetrabromide plus molecular iodine, and titanium tetraiodide; and
d. an ether represented by the general formula R''OR''' wherein R'' and R''' are alkyl or cycloalkyl groups containing from about 1 to 12 carbon atoms per R'' or R''' group and wherein the ether contains up to 20 carbon atoms per molecule.

4,020,008

CATALYSTS FOR PRODUCING HIGH TRANS-POLYBUTADIENE

Floyd E. Naylor, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 447,201, March 1, 1974, Pat. No. 3,926,933. This application Sept. 4, 1975, Ser. No. 610,358
Int. Cl.² C08F 4/60
U.S. Cl. 252—429 B 5 Claims

1. A catalyst useful for the production of high trans-polybutadiene consisting essentially of:
a. an oxyether solution of a reducing agent represented by the general formula XMH_4, wherein X is a metal selected from the group consisting of lithium, sodium, potassium, rubidium, and cesium, and M is Al;

b. a titanium halide component selected from the group consisting of titanium tetrachloride plus molecular iodine, titanium tetrabromide plus molecular iodine, and titanium tetraiodide; and

c. at least one thioether represented by the general formula

R—S—R′

wherein R and R′ are hydrocarbon radicals selected from the group consisting of alkyl and cycloalkyl radicals containing from about 1 to 12 carbon atoms, or R and R′ are hydrocarbon radicals selected from the group consisting of alkylene groups joined to the sulfur atom and to each other to form a saturated heterocyclic thioether containing from about 4 to 10 carbon atoms.

4,020,009

CATALYST COMPOSITION AND METHOD OF PREPARATION

Michael Gulla, Sherborn, Mass., assignor to Shipley Company, Inc., Newton, Mass.

Filed Sept. 30, 1975, Ser. No. 618,033
Int. Cl.² B01J *31/30*
U.S. Cl. 252—429 R **42 Claims**

1. An essentially dry composition which, upon admixture with an aqueous hydrohalide acid solution having a pH of less than 1, forms a stable colloidal catalyst solution for catalyzing a substrate prior to the deposition of an electroless metal, said essentially dry composition comprising a catalytic metal in a reduced form insoluble in an aqueous acid solution of pH less than 1 and tin compounds, at least a portion of said tin compounds being in stannous form, the molar ratio of stannous tin to catalytic metal being at least 2:1.

40. A plastic substrate having the catalyst composition of claim **1** dispersed throughout at least its surface.

4,020,010

TIN TITANIUM COMPLEXES AS ESTERIFICATION/TRANSESTERIFICATION CATALYSTS

Herwart C. Vogt, Grosse Ile; Manher Parekh, Woodhaven, and John T. Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 29, 1975, Ser. No. 644,357
Int. Cl.² B01J *31/2*
U.S. Cl. 252—431 C **7 Claims**

1. The method of preparing complexes comprising mixing a tetraalkyl or tetraaryl titanate compound having the formula $Ti(OR)_4$ wherein R is a radical selected from the group consisting of an aliphatic radical having from 1 to 18 carbon atoms, an alicyclic radical having between 1 and 3 rings, between 5 and 6 carbon atoms per ring, and between 5 and 18 carbon atoms per molecule, and an aromatic radical having between 1 and 3 rings and between 6 and 18 atoms per molecule, with a stannous carboxylate having the formula

$$Sn\left(\begin{array}{c}O\\ \|\\ OCR'\end{array}\right)_2$$

wherein R′ is an organic radical having from 1 to 18 carbon atoms in a mole ratio from 1:1 to 1:8 titanate to stannous carboxylate and stirring the mixture until substantially all the titanate has reacted with the stannous carboxylate to form said complex.

4,020,011

METHOD FOR PREPARING HYDROCARBON CONVERSION CATALYST

Eiichiroh Nishikawa, Saitama; Takuji Itoh, Sayama, and Tadashi Miura, Saitama, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 10, 1975, Ser. No. 566,979
Claims priority, application Japan, Apr. 19, 1974, 49-44194
Int. Cl.² B01J *27/06*
U.S. Cl. 252—441 **21 Claims**

1. In a method for preparing a hydrocarbon conversion catalyst comprising from about 0.01 to about 3 weight % of a Group VIII noble metal component, from about 0.1 to about 5 weight % of a halogen component and a tin component composited with a refractory carrier, the improvement which comprises compositing said tin component with said carrier by impregnating said carrier or the carrier which supports the said noble metal component and/or halogen component with a solution comprising an organic solvent containing a hydrogen halide and a soluble compound of tin.

13. A method for preparing a hydrocarbon conversion catalyst which comprises the following steps in combination:

1. impregnating a refractory carrier with an aqueous halogen acid solution comprising from about 0.01 to 2 weight % of a Group VIII noble metal compound;
2. washing and drying the impregnated carrier from step (1);
3. impregnating the product of step (2) with a solution comprising an organic solvent containing a hydrogen halide and from about 0.01 to 2 weight % of a soluble compound of tin; and
4. washing and drying the product of step (3).

4,020,012

METHOD FOR PREPARING HYDROCARBON CONVERSION CATALYST

Tadashi Miura, Saitama; Tomio Nomura, Higashi-matsuyama, and Kohei Kubota, Kasukabe, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1975, Ser. No. 644,606
Claims priority, application Japan, Jan. 31, 1975, 50-13239
Int. Cl.² B01J *27/06*
U.S. Cl. 252—441 **12 Claims**

1. In a method for preparing a hydrocarbon conversion catalyst which comprises a Group VIII noble metal component, a tin component, and a halogen component composited with a refractory carrier, the improvement which comprises impregnating the said carrier or the carrier which supports the said noble metal component and/or halogen component with a solution comprising a soluble compound of tin dissolved in a solvent consisting of an organo thionyl compound, whereby the tin component is uniformly dispersed from the surface into the inner part of said catalyst.

4,020,013

CATALYTIC COMPOSITE FOR TREATING EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE

John F. Brennan, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Oct. 20, 1975, Ser. No. 624,210
Int. Cl.² B01J *21/04, 23/42, 23/46*
U.S. Cl. 252—466 PT **4 Claims**

1. A catalytic composite suitable for use in the treatment of exhaust gases from an internal combustion engine to convert nitrogen oxides to nitrogen, said composite consisting of ruthenium, platinum and from about 0.02 to about 0.10 wt. % rhodium deposited on a high surface area refractory inorganic oxide carrier wherein the weight ratio of rhodium to ruthenium is from about 1:1 to about 2:1 and wherein said platinum is in from about a 1:1 to about 8:1 weight ratio with said rhodium.

4,020,014
SEMI-CONDUCTIVE SILICONE ELASTOMERS

Alfred Lewis Service, Watervliet, and George Christie, Jr., Albany, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Jan. 21, 1976, Ser. No. 650,969
Int. Cl.² H01B 1/06
U.S. Cl. 252—511 **21 Claims**

1. In a composition vulcanizable to an electrically conductive silicone elastomer, said composition comprising:
   i. a vinylorganopolysiloxane gum;
   ii. an organohydrogenpolysiloxane;
   iii. an electically conductive carbon black filler in an amount capable of rendering the cured composition electrically conductive; and
   iv. a small, effective amount, sufficient to cure the composition with steam or under compression molding conditions, of a peroxide catalyst which is not normally capable of curing the composition on exposure to hot air, the improvement which comprises including in said composition
   v. a catalyst comprising platinum or a platinum compound in a small amount, at least effective to render the composition vulcanizable upon exposure to hot air but less than an amount which will cause any substantial cross-linking of the composition within 24 hours at a temperature of about 23° C.

4,020,015
DETERGENT COMPOSITIONS

Geoffrey Bevan, Wirral, England, assignor to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 350,262, April 11, 1973, abandoned.
This application Nov. 14, 1975, Ser. No. 632,040
Claims priority, application United Kingdom, Oct. 12, 1971, 47397/71
Int. Cl.² C11D 3/37, 17/00
U.S. Cl. 252—544 **3 Claims**

1. In an improved built laundry detergent composition in powder form including a soil-release agent selected from the group consisting of:
   a. a copolymer, in the range of 1:2 to 1:10, of polyoxyethylene glycol and polyethylene terephthalate;
   b. a condensation product of (i) polyoxyethylene glycol, (ii) adipic acid and (iii) caprolactam or hexamethylene diamine or its salts of caprolactam or hexamethylene diamine with adipic acid; or
   c. a cellulose containing an ether-linked, unsubstituted C_3 to C_4 alkyl group and an ether-linked substituent based on a C_2 to C_4 hydroxy alkyl group in which the total number of substituent groups per glucose unit of the cellulose is between 1.5 to 3.0,

wherein the improvement comprises the incorporation into said detergent composition of said soil release agents in the form of granules, said granules consisting essentially of about 5 to about 70% by weight of said agent dispersed throughout a solid, water soluble, detergent compatible carrier, said carrier being a material other than said soil-release agents.

4,020,016
CLEANING COMPOSITIONS EFFECTIVE IN DISSOLVING SOAP CURD

Charles S. Sokol, Forest Park, Ohio, assignor to The Drackett Company, Cincinnati, Ohio

Filed Feb. 28, 1975, Ser. No. 554,034
Int. Cl.² C11D 1/10, 1/83
U.S. Cl. 252—546 **8 Claims**

1. A soap curd dissolving cleaning composition consisting essentially of:
   a. from about 1–5% by weight of a member selected from the group consisting of an ammonium, alkylamine or hydroxyalkylamine salt of nitrilotriacetic acid, an alkylene polyamine polycarboxylic acid, or mixtures thereof, wherein said alkylene polyamine polycarboxylic acid has the formula

$$(HOOCCH_2)_2N[(CH_2)_xNCH_2COOH]_yCH_2COOH$$

   wherein the values of x and y may vary independently from 1 to 7,
   b. from about 0.75–2% by weight of at least one nonionic surfactant characterized as having an HLB number of at least about 13.5 selected from the group consisting of:
      1. ethoxylated linear primary alcohols having the formula

$$C_mH_{2m+1}O(CH_2CH_2O)_nH,$$

      wherein m can vary from 12 to 15 and n is at least 12;
      2. an ethoxylated linear primary alcohol which is a clear liquid having an HLB number of 14, a freezing point of 1° $C_{\bullet}$a cloud point of 400° F, a pH of 6–8, and a specific gravity of 1.02 at 25° C;
      3. ethoxylated linear secondary alcohols having the formula

$$CH_3(CH_2)_m\underset{\displaystyle O-(CH_2CH_2O)_nH}{\underset{|}{CH}}(CH_2)_pCH_3$$

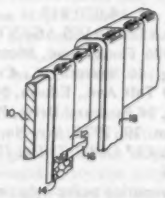
      wherein the sum of m and p is 9 to 13 and of n is at least 12; and
      4. ethoxylated octyl phenols having the formula

      wherein n is at least 9; and
   c. up to about 98.25% by weight of water wherein the alkyl substituent of said alkylamine and hydroxy-alkylamine has a chain length of from 1 to 5 carbon atoms and said composition is substantially free of sodium ions.

4,020,017
EPOXIDES CONTAINING ORGANO-TIN COMPOUNDS AND ELECTRICAL MEMBERS INSULATED THEREWITH

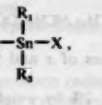
James D. B. Smith, Turtle Creek, and Robert N. Kauffman, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 8, 1975, Ser. No. 575,755
Int. Cl.² C08G 59/24, 59/68
U.S. Cl. 260—2 EC **15 Claims**



1. A resinous composition consisting essentially of:
   A. an epoxide mixture having a weight ratio of non-glycidyl ether epoxide containing more than one 1,2 epoxy group per molecule selected from the group consisting of cycloaliphatic epoxides and glycidyl ester epoxides: reactive low viscosity epoxide diluent containing more than one 1,2 epoxy group per molecule, of between about 1:0.10 to 1:0.90; and
   B. an amount of an organo-tin compound, acting as a latent

catalyst, selected from compounds having the structural formula:



wherein R_1, R_2 and R_3 are selected from the group consisting of alkyl groups having from about 1 to 10 carbon atoms, aryl groups, Cl, Br, or NO2 substituted aryl groups, alkaryl groups with the alkyl constituent having from about 1–10 carbon atoms, Cl, Br, or NO2 substituted alkaryl groups with the alkyl constituent having from about 1–10 carbon atoms, aralkyl groups with the alkyl constituent having from about 1–10 carbon atons, cyclopentane groups, cyclopentene groups, cyclopentadiene groups, cyclohexane groups, cyclohexene groups, cyclohexadiene groups, pyrrolidine groups, pyrrole groups, tetrahydrofuran groups, dioxane groups ,pyridine groups, and piperidine groups, and X is selected from the group consisting of halide, hydroxide, acetate, butyrate, propionate and dimethyl phosphate, to be effectively dissolved in the epoxide mixture.

4,020,018

ALKENE OXIDE OR ACRYLATE POLYMERIZATION OR COPOLYMERIZATION CATALYZED BY ORGANOALUMINUM-ORGANOPHOSPHINE-METAL SALT OF A BETA-DIKETONE

Henry L. Hsieh, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 416,816, Nov. 19, 1973, Pat. No. 3,925,317. This application May 13, 1975, Ser. No. 577,137

Int. Cl.² C08F *4/52;* **C08G** *65/12, 65/14, 65/26*

U.S. Cl. 260—2 A **19 Claims**

1. A process for the polymerization of a monomer comprising at least one mono-oxirane monomer under polymerization conditions, employing a catalyst system comprising (I) hydrocarbon aluminum compound R_nAlH_m wherein each R is a hydrocarbon radical, n is an integer of 1 to 3, inclusive, and m is zero or an integer of 1 to 2, such that $n + m$ equal 3, (II) triorganophosphine compound R'_3P where R′ is hydrocarbon or alkoxy-substituted hydrocarbon, and (III) a beta-diketone substantially as the metal salt of said beta-diketone, in catalytically effective ratios,

wherein said metal of said (III) is beryllium, magnesium, calcium, strontium, barium, boron, aluminum, gallium, indium, thallium, germanium, tin, lead, zinc, cadmium, or mercury.

4,020,019

ANTICARIES AGENTS

Gianluigi Soldati, 486 Flock Road, Mercerville, N.J. 08619; Ralph G. Eilberg, 46 Seventh St., Cresskill, N.J. 07626; Helga Melger, 60 Taft Ave., Edison, N.J. 08817, and William M. Wooding, 24 Bertrand Drive, Princeton, N.J. 08540

Filed Jan. 29, 1975, Ser. No. 545,030

Int. Cl.² C08G *73/04, 79/02*

U.S. Cl. 260—2 EN **8 Claims**

1. A method of preparing polyethylenimines of the formula:

$$[CH_2CH_2NH]_x \cdot [(HO)_nPF_n]_y$$

wherein x has a value of 7.5 to 1000 and m and n are positive whole integers whose sum is three and y has a value of up to 80% of x which comprises combining an aqeuous or alcoholic solution of a polyethylenimine reactant having a molecular weight of from about 300 to about 40,000 with an aqueous or alcoholic solution of an acid reactant selected from the group consisting of mono and diflurophosphoric acid at temperatures ranging from about 5° C to about 26° C at a rate such that the temperature of said reactant solutions and the resulting reaction mixture is kept as nearly constant as possible throughout the combination step and recovering the desired solid polyethylenimine fluorophosphate.

4,020,020

METHOD OF TREATING WASTE SHEET FLOORING

Francis J. Appleyard, East Petersburg, and Stavros C. Stavrinou, Lancaster, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed June 17, 1975, Ser. No. 587,547

Int. Cl.² C08J *11/04*

U.S. Cl. 260—2.3 **3 Claims**

1. A process for recovering scrap sheet floor covering material which is composed of a felted fibrous backing cured to a nonfibrous resin wear surface which comprises the steps of;

a. dicing said scrap sheet floor covering to reduce it to small pieces,

b. masticating the sheet floor covering pieces with an intense shearing action while under mechanical compression to grind up the fibrous backing and the resin wear surface for the purpose of comingling these materials,

c. adding supplemental resin materials to the comingled mass of fibrous backing and resin wear surface materials to the point that a desired ratio of resin to fibrous material is secured in the resulting mass, and

d. blending the resulting mass which now blended can be utilized as part of a new floor covering materials of blended fiber and resin material.

4,020,021

PROCESS FOR MANUFACTURING POLYMERS OF BICYCLO [2.2.1] HEPTENE-2 AND ITS SUBSTITUTION DERIVATIVES

Jean Lahouste, Verneuil-en-Halatte; Maurice Lemattre, Cinqueux; Jean-Claude Muller, and Claude Stein, both of Verneuil-en-Halatte, all of France, assignors to Societe Chimique des Charbonnages, Courbevoie, France

Filed Mar. 25, 1975, Ser. No. 561,789

Claims priority, application France, Mar. 26, 1974, 74.10368

Int. Cl.² C08J *9/00;* **C08F** *2/00, 4/44, 110/00*

U.S. Cl. 260—2.5 H **7 Claims**

1. In a method for manufacturing finely divided expanded ring opened polymers comprising polymerizing a bicyclo [2.2.1.] heptene-2 compound in the presence of a catalyst system selected from the group consisting of a noble metal compound with a reducing substance and a tungsten compound with a compound having at least one metal-hydrocarbon link, the improvement comprising:

effecting said polymerization in a polymerization zone under super-atmospheric pressure and at an elevated temperature, passing the obtained mixture into an expansion zone maintained at a pressure substantially lower than that of said polymerizing zone and at a temperature higher than the vaporization temperature of the constituents of the reaction mixture to thereby simultaneously blow the so obtained polymer and dry said polymer, and dividing the resultant polymer to provide an apparent density from 0.2 to 0.8.

4,020,022
PROCESS FOR PRODUCING PARTICLES OF EXPANDABLE STYRENE POLYMERS AND ARTICLES OF CELLULAR STRUCTURE FORMED FROM SAID PARTICLES

Gianfranco Biglione; Antonio Alvares, both of Mantova, and Guido Bertazzoni, Campitello di Marcaria (Mantova), all of Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Continuation of Ser. No. 470,856, May 17, 1974, abandoned. This application Aug. 12, 1975, Ser. No. 603,812

Int. Cl.² C08J 9/22

U.S. Cl. 260—2.5 HB **12 Claims**

1. Process for the preparation of shaped bodies based on expanded styrene polymers comprising, in the given order: the polymerization of styrene or a mixture thereof with at least one monomer copolymerizable therewith, the addition of an expanding agent, pre-expansion of the resulting expandable particles, ageing of the pre-expanded particles, and molding thereof in a pressure resistant and non gas-tight mold, characterized in that the polymerization is carried out in the presence of 0.001 to 1% parts by weight of at least one elastomeric olefinic copolymer selected from the group consisting of elastomeric binary copolymers of ethylene and propylene and elastomeric terpolymers of ethylene, propylene and a diene.

4,020,023
ADDITIVES FOR INCREASING THE DENSITY OF URETHANE FOAMS PREPARED FROM ADNC

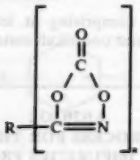
Larry G. Wolgemuth, Flossmoor, Ill., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 351,695, April 16, 1973, abandoned. This application Jan. 8, 1974, Ser. No. 539,471

Int. Cl.² C08G 13/00, 18/80

U.S. Cl. 260—2.5 A **11 Claims**

1. In a process for preparing a polymeric composition by condensing-rearranging a cyclic nitrile compound of the structural formula



wherein R is an organic radical free of reactive hydrogen atoms as determined by the Zerewithinoff test, and *n* is at least 2 with an organic compound containing at least two functional groups selected from the group consisting of hydroxyl, thiol, primary amine, secondary amine, and mixtures of these, the improvement comprising carrying out the reaction in the presence of a sufficient amount of a metal oxide selected from the group consisting of calcium oxide, barium oxide, or mixtures of these to produce a composition having the desired density.

11. A high density cellular polyurethane composition prepared by reacting adipodi(nitrile carbonate) with a polyester polyol or polyether polyol having a molecular weight of greater than about 750 and a hydroxyl number of about 10 to 600 in the presence of calcium oxide, barium oxide, or mixtures of these.

4,020,024
HALOGENATED POLYETHER-POLYOLS AND POLYURETHANE FOAMS MANUFACTURED FROM THE LATTER

René Walraevens, Brussels, and André Collin, Ligny, both of Belgium, assignors to Solvay & Cie, Brussels, Belgium

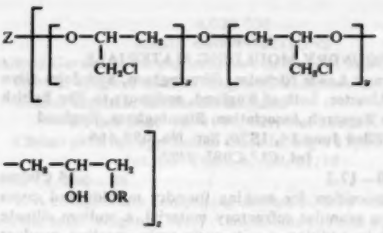
Filed Oct. 23, 1974, Ser. No. 517,396

Claims priority, application France, Oct. 24, 1973, 73.38186

Int. Cl.² C08J 9/00

U.S. Cl. 260—2.5 AP **22 Claims**

1. In the production of a semi-rigid or rigid polyurethane foam from a polyether-polyol, the improvement wherein the polyether-polyol comprises at least one polyether-polyol according to the general formula:



in which *z* represents a number from 2 to 6; *x* and *y* represent numbers from 0 to 7 such that the average value $x + y$ per chain is from 0 to 7; $z(x + y)$, wherein $x + y$ represents the average value of $x + y$ throughout the entire molecule, is from 1 to 42; Z represents a C_2 to C_6 aliphatic radical of valency *z*; and R represents a C_1 to C_5 monovalent aliphatic radical.

4,020,025
EXTRUDABLE FOAMABLE COMPOSITION COMPRISING AN OLEFIN POLYMER, A STYRENE POLYMER AND A HYDROGENATED STYRENE BUTADIENE BLOCK COPOLYMER

Gerhard Zeitler, Hessheim, and Heinz Mueller-Tamm, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Continuation of Ser. No. 467,256, May 6, 1974, abandoned. This application May 17, 1976, Ser. No. 686,901

Claims priority, application Germany, May 8, 1973, 2323031; Mar. 22, 1974, 2413863

Int. Cl.² C08J 9/14

U.S. Cl. 260—2.5 HB **8 Claims**

1. Extrusion-foamable composition of polyolefins and styrene polymers, which comprises a mixture of

a. 5 to 90% by weight of ethylene or propylene polymers,

b. 10 to 95% by weight of styrene polymer,

c. 0.5 to 10% by weight, based on the combined weight of polyolefin (a) and styrene polymer (b), of a hydrogenated styrene/butadiene block polymer and

d. 5 to 30% by weight, based on the combined weight of polyolefin (a) and styrene polymer (b), of at least one low-boiling expanding agent, said styrene polymer (b) having a higher molecular weight, measured by the melt index, than that of the polyolefin (a) and is finely dispersed in the polyolefin (a) forming the continuous phase, and said hydrogenated styrene/butadiene block polymer (c) having a viscosity average moleclar weight of from 3,000 to 800,000.

4,020,026

PLASTICITY INDEX IMPROVERS AND METHOD OF USE

Frits W. Janssen, Serbalawan, Sumatra, Indonesia, and Edward A. Sinclair, Kent, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 17, 1975, Ser. No. 568,876
Int. Cl.² C08L 7/02
U.S. Cl. 260—3 5 Claims

1. A method of improving plasticity and plasticity retention index of natural rubber comprising treating a natural rubber latex with about 0.05 to 1.0 part of polyethylenimine of about 600 to 100,000 molecular weight per 100 parts of rubber, coagulating the latex and recovering the rubber from the latex.

4,020,027

FOUNDRY MOULDING MATERIALS

Kenneth Ernest Lewis Nicholas, Birmingham, and John Glyn Morley, Alcester, both of England, assignors to The British Cast Iron Research Association, Birmingham, England

Filed June 14, 1976, Ser. No. 695,466
Int. Cl.² C08L 3/02
U.S. Cl. 260—17.2 14 Claims

1. A composition for making foundry moulds and cores comprising a granular refractory material, a sodium silicate binder, and in addition a polymeric resin reaction product resulting from the heating of a mixture of phenol, a carbohydrate and formaldehyde in the presence of a catalyst.

4,020,028

PROCESS AND BATH COMPOSITION FOR INCREASING THE RATE OF POLYMER DEPOSITION IN ELECTROCOATING

Michael Alan Dudley, Beaconsfield, Canada, assignor to Canada Wire and Cable Limited, Toronto, Canada

Filed Jan. 2, 1974, Ser. No. 429,771
Claims priority, application Canada, Dec. 29, 1972, 160228
Int. Cl.² C08J 3/20
U.S. Cl. 260—18 EP 16 Claims

1. An electrocoating bath composition for depositing a coat of polymer material onto an anode, said bath composition comprising an essentially aqueous solution, emulsion or dispersion of said polymer suitable for electrodeposition on the anode when an electric current is passed therethrough, and comprising 0.01 to 2.0% by weight with reference to the bath composition of a compound of the general formulae:

X - R - X'

wherein

R is acyclic, saturated carbocyclic, unsaturated carbocyclic containing one C ring, heterocyclic, or carbocyclic and heterocyclic rings linked together through a ring atom or linked together through an acyclic saturated or unsaturated radical,

X is a phenolic or enolic —OH group, and

X' is a hydrogen atom or X,

said groups X being in such electronic configuration with reference to R that there is always a presence of labile protons therein under operative conditions of the electrocoating bath, or of a salt of said compound, said compound or its salt being in an at least partially disassociated state in said electrocoating bath composition and capable of proton association in close vicinity of the anode under conditions of operation.

4,020,029

TACKIFIER

Walter Gorbunow, Coon Rapids, Minn., assignor to PDI, Inc., St. Paul, Minn.

Filed Oct. 1, 1975, Ser. No. 618,516
Int. Cl.² C08L 91/00
U.S. Cl. 260—24 3 Claims

1. A normally inert coating composition activatable under hand heat and pressure to form a tacky film and adapted for application to gripping handles of hand-held instruments and comprising a composition having the formulation:

Component	Parts by Weight
coumarone-indene resin having a softening point of about 60° C.	6 to 12
Pentaerythritol ester of rosin having a softening point of about 105° C.	8 to 12
Aliphatic hydrocarbon solvent	balance

4,020,030

REACTION PRODUCTS OF EPOXY RESINS, ORGANIC SULFIDES AND PROTIC ACIDS

Robert F. Harris, and Nancy B. Tefertiller, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 24, 1975, Ser. No. 552,519
Int. Cl.² C08G 51/24, 30/04
U.S. Cl. 260—29.2 EP 27 Claims

1. A water-soluble or water-dispersible reaction product of (1) an epoxy resin bearing a plurality of vicinal epoxy groups and having an epoxy equivalent weight (EEW) of at least about 500; (2) an organic sulfide; and (3) a protic acid having a dissociation constant of at least 1×10^{-5}.

4,020,031

POLY(ARYLENE SULFIDE) COATING COMPOSITIONS CONTAINING ALKALI METAL ALKYLBENZENESULFONATE

R. F. Merrill, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 15, 1975, Ser. No. 613,668
Int. Cl.² C08J 3/06
U.S. Cl. 260—29.2 R 31 Claims

1. A composition comprising at least one poly(arylene sulfide) resin and at least one alkali metal alkylbenzenesulfonate.

4,020,032

CONTINUOUS PROCESS FOR THE REMOVAL OF MONOMERIC IMPURITIES FROM AQUEOUS DISPERSIONS OF HOMO- AND COPOLYMERS OF VINYL CHLORIDE

Josef Kalka, Herten; Hermann Winter, Marl, and Jurgen Beckmann, Oer-Erkenschwick, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Aug. 21, 1975, Ser. No. 606,736
Claims priority, application Germany, Aug. 27, 1974, 2440957
Int. Cl.² C08L 57/08
U.S. Cl. 260—29.6 R 10 Claims

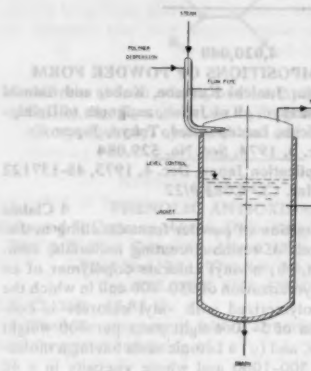
1. A process for removing residual monomer from an emulsifier-containing aqueous dispersion of a solid vinyl chloride polymer which dispersion has a surface tension of less than 60 dyne/cm., which comprises:

a. continuously admixing said dispersion with steam having a temperature of not greater than 100° C. in a fluid flow pipe to form an admixture therein having a pressure of

150–600 torr, a temperature of about 60°–94° C. and a flow velocity therethrough of 1–20 m./sec;

b. passing said admixture at an exit velocity of 30–100 m./sec horizontally into and along the walls of a degasification tank having a pressure 30–200 torr lower than the pressure in said flow pipe to evaporate residual monomer from said dispersion; and

c. continuously withdrawing the resultant dispersion from the degasification tank.



4,020,033
POLYTHIOETHER SEALANT COMPOSITIONS

Bobby F. Dannels, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 501,716, Aug. 29, 1974, abandoned. This application June 2, 1975, Ser. No. 582,959

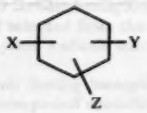
Int. Cl.² C08K *5/09*

U.S. Cl. 260—31.8 Z **18 Claims**

1. A sealant system comprising as a first component a mercaptan-terminated polythioether of the formula

$$HS[(RS)_nR^1S]_m(RS)_nH$$

where R is propylene or trimethylene or mixtures thereof, R^1 is propylene or a mixture of propylene and a substituted cyclohexane radical of the formula



wherein X, Y and Z are substituents attached to different carbon atoms of the cyclohexane ring and two of X, Y and Z are $-CH_2CH_2-$ and one of X, Y and Z is $-CH_2CH_2(SR)_n[_{SR}{}^1(SR)_n]_mSH$, said substituted cyclohexane radical being present at about 0.1 to about 3 mole percent of the total moles of R, *n* is 1 to about 10 and *m* is 1 to about 200; a filler; a plasticizer selected from the group consisting of chlorinated methylstearate; a phthalate ester and mixtures thereof; an adhesion additive selected from gamma-mercaptopropyltrimethoxysilane and gamma-glycidoxypropyltrimethoxysilane; and a cure accelerator selected from the group consisting of tetraethylthiuram disulfide, tetramethylthiuram disulfide, para quinone dioxime, and tri(dimethylamino)-phenol and mixtures thereof, and as a second component, an oxidative curing agent selected from manganese dioxide and lead dioxide.

4,020,034
EPOXY RESIN COATING COMPOSITION

Edward R. Freiter, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 11, 1975, Ser. No. 603,894

Int. Cl.² C08K *5/01, 5/02, 5/06, 5/07*

U.S. Cl. 260—32.8 EP **3 Claims**

1. An epoxy resin coating composition which comprises

A. an epoxy resin which is the adduct of glycidol with an aliphatic or cycloaliphatic diisocyanate in a molar ratio of 2:1 respectively;

B. a curing quantity of an aliphatic or cycloaliphatic acid or anhydride thereof; and

c. a suitable organic solvent or mixture thereof in a quantity such as to provide the coating composition with a suitable application viscosity.

4,020,035
RESIN COMPOSITIONS

Alfred Gerald Edwards, Stourport on Severn, and Glyn Islwyn Harris, Hagley, both of England, assignors to Albright & Wilson Limited, Midlands, England

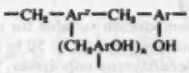
Filed Sept. 16, 1974, Ser. No. 506,242

Claims priority, application Canada, Sept. 17, 1973, 181229

Int. Cl.² C08L *61/10, 61/18*

U.S. Cl. 260—38 **27 Claims**

1. A composition comprising at least 50% by weight (based on the total weight of resin components (a) and (b)) of resin component (a), a resin haing repeating units of the formula



wherein Ar^2 is a divalent or trivalent aromatic hydrocarbyl radical selected from the group consisting of aromatic hydrocarbyl groups and aromatic hydrocarbyl groups having at least one substituent selected from the groups consisting of chlorine and fluorine atoms and methyl groups, and Ar is the residue formed by removal of two nuclear hydrogen atoms from a phenolic compound with 1 – 3 hydroxyl groups and at least two nuclear hydrogen atoms and *n* is 0 or 1, and 1 to 50% by weight (based on the total weight of resin components (a) and (b)) of resin component (b), a resin formed by reaction of a phenolic compound and an aldehyde and selected from the group consisting of novolac resins and resole resins.

4,020,036
THERMOSETTING POLYESTER COMPOSITION CONTAINING NORMALLY SOLID CARBOXY-CONTAINING DIENE POLYMER

Aubrey South, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 22, 1976, Ser. No. 679,284

Int. Cl.² C08L *67/06*

U.S. Cl. 260—40 R **16 Claims**

1. A composition comprising:

a. an unsaturated polyester prepared by reacting an unsaturated dicarboxylic acid and a polyol;

b. a normally solid carboxy-containing polymer of a conjugated diene having a weight average molecular weight within the range of 30,000 to 400,000;

c. a vinyl monomer;

d. a catalyst; and

e. at least one of a reinforcing agent or a filler.

4,020,037

PROCESS FOR THE SPIN-DYEING OF POLYMERS OR COPOLYMERS OF ACRYLONITRILE

Manfred Hähnke, Kelkheim, Taunus; Theodor Papenfuhs, Frankfurt am Main, and Wolfgang Teige, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Nov. 26, 1974, Ser. No. 527,414

Claims priority, application Germany, Nov. 29, 1973, 2359466

Int. Cl.² C08K 5/00; C08L 33/20; D01F 1/06

U.S. Cl. 260—42.21 2 Claims

1. In a process of spin-drying of acid modified polymers or copolymers of acrylonitrile with vinyl compounds selected from the group consisting of vinyl chloride, vinyl fluoride, vinylidene chloride, vinyl acetate, vinylpropionate, vinyl pyridine, vinyl imidazole, vinyl pyrrolidone, vinyl alcohol, acrylic acid esters, methacrylic acid esters and acrylamides these copolymers containing at least 70% by weight of acrylonitrile and acid groups, with basic dyestuffs selected from the group consisting of the triarylmethane, indoldiarylmethane, azine, oxazine, thiazine, acridine and xanthene series, by means of spinning solutions of the polymers containing the basic dyestuff, the improvement consisting of using the dyestuff in the spinning solution in the form of its imine base or carbinol base.

4,020,038

PAINTABLE RUBBER COMPOSITION AND PRODUCTS PREPARED THEREFROM

Joseph F. O'Mahoney, Jr., Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 19, 1975, Ser. No. 615,137

Int. Cl.² C08K 3/06

U.S. Cl. 260—42.33 9 Claims

1. A polymeric composition suitable for use in sight shields and automotive facia comprising (A) 50 to 80 parts by weight of a rubbery butadiene/styrene copolymer, (B) 20 to 50 parts by weight of an ethylene/propylene/nonconjugated diene terpolymer and (C) 15 to 50 parts by weight of a butadiene/styrene resin, all parts being by weight per 100 parts by weight of (A) plus (B) wherein the rubbery butadiene/styrene copolymer has a bound styrene content of from 5 to 50 weight percent and the butadiene/styrene resin has a bound styrene content of from 75 to 90 weight percent.

4,020,039

VULCANIZABLE ELASTOMERIC COMPOSITIONS

John Robert Dunn, and Douglas Currie Coulthard, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Feb. 28, 1975, Ser. No. 554,142

Claims priority, application Canada, May 13, 1974, 199653

Int. Cl.² C08K 3/36

U.S. Cl. 260—42.37 10 Claims

1. An improved vulcanizable elastomeric composition comprising:

1. 100 parts by weight of a rubbery polymer containing at least 50 weight percent but not more than 85 weight percent of polymerized C_4–C_6 conjugated alkadiene units;
2. from 10 parts to 200 parts by weight of filler selected from the non-black inorganic particulate fillers;
3. antioxidant;
4. a vulcanization system containing in combination
   a. from 0.05 to 2.5 parts by weight of sulphur,
   b. from 2 to 20 parts by weight of magnesium oxide,
   c. from 2 to 10 parts by weight of one of cadmium oxide or zinc oxide.
   d. one of
      i. 1 to 8 parts by weight of cadmium dialkyl dithiocarbamate wherein said alkyl groups contain 1 to 5 carbon atoms, or
      ii. 0.2 to 8 parts by weight of a tetraalkyl thiuram disulphide wherein said alkyl groups contain 1 to 4 carbon atoms;

the improvement being the presence of from 0.5 to 10 parts by weight of as vulcanization co-agent N,N′-m-phenylene dimaleimide.

4,020,040

COLORING COMPOSITIONS OF POWDER FORM

Tsutomu Kattoh, Suita; Junichi Kumabe, Kobe, and Satoshi Hirabayashi, Nagaokakyo, all of Japan, assignors to Dainippon Ink and Chemicals, Incorporated, Tokyo, Japan

Filed Dec. 3, 1974, Ser. No. 529,084

Claims priority, application Japan, Dec. 4, 1973, 48-137122

Int. Cl.² C08J 3/22

U.S. Cl. 260—42.56 4 Claims

1.A coloring composition of powder form excelling in dispersiveness in solutions of resinous coating materials, comprising (a) a pigment, (b) a vinyl chloride copolymer of an average degree of polymerization of 350–800 and in which the other monomer copolymerized with vinyl chloride is contained in a proportion of 5–30 weight parts per 100 weight parts of vinyl chloride, and (c) a ketonic resin having a molecular weight of from 500–1000 and whose viscosity in a 40 weight % dimethyl-formamide solution is 80–7500 centipoises, said (b) and (c) being present on a weight basis in proportions of 1:0.5–5 said (a) being present in proportions of 20–80% by weight of the sum total of (a), (b) and (c).

4,020,041

POLYMERS STABILIZED WITH BIS-HETEROCYCLIC BENZOATES

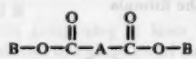
Gether Irick, Jr., and Charles A. Kelly, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 484,843, July 1, 1974, Pat. No. 3,963,738. This application Feb. 12, 1976, Ser. No. 657,509

Int. Cl.² C08K 5/35

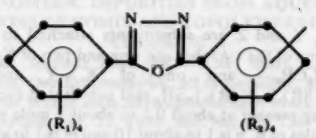
U.S. Cl. 260—45.8 NZ 9 Claims

1. A synthetic polymer composition susceptible to ultraviolet light degradation stabilized against such degradation with a stabilizing amount of at least one aryl ester of a heterocyclic aromatic acid having the formula:



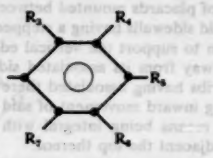
wherein

A has the structure



wherein R_1 and R_2 are hydrogen, chloro, bromo, lower alkyl or cyano and are present on all positions of the benzenoid rings, except the carbon atoms attached to the carboxyl group connecting the heterocyclic aromatic A group with the aromatic B group, said carboxyl connecting group is attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the heterocyclic ring;

B is a group having the formula



wherein at least one R_3 or R_7 is hydrogen and the other R_3, R_4, R_5, R_6 and R_7 are hydrogen, lower alkyl, lower alkoxy, hydroxy, cyano, chloro and bromo.

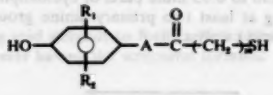
4,020,042

PHENOLIC ANTIOXIDANTS

Kirkwood S. Cottman, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

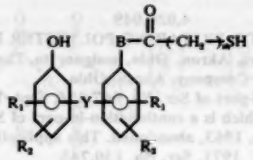
Filed Nov. 20, 1974, Ser. No. 525,439
Int. Cl.² C08K 5/37; C07C 5/00
U.S. Cl. 260—45.85 H **4 Claims**

1. Phenolic compounds with a structural formula selected from the group consisting of



(I)

and



(II)

wherein R_1 and R_2 are the same or different radicals selected from the group consisting of hydrogen, alkyl radicals having from 1 to 10 carbon atoms, cycloalkyl radicals having from 5 to 8 carbon atoms, aralkyl radicals having from 7 to 9 carbon atoms, and substituted and unsubstituted aryl radicals containing from 6 to 8 carbon atoms, m is 1 or 2, A is selected from the group consisting of —K—X—, —X—Z—X— or —T—Z—X— and B is —X—Z—X— wherein K is an alkylene group containing from 1 to 10 carbon atoms, Z is an alkylene radical containing from 2 to 10 carbon atoms, X is oxygen, T is sulfur, Y is a bivalent radical selected from the group consisting of —O—, —S— and alkylene radicals containing from 1 to 5 carbon atoms.

3. An ole fin polymer having incorporated therein in an antioxidant amount a compound according to claim 1.

4,020,043

VULCANIZABLE ALKOXYSILYL CAPPED POLYMER COMPOSITION

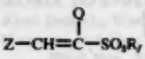
Mark W. Siefken, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 7, 1975, Ser. No. 556,495
Int. Cl.² C08G 77/04
U.S. Cl. 260—46.5 G **6 Claims**

1. A storage stable viscous resinous composition curable at room temperature on exposure to moisture, comprising:

a. a vulcanizable polymer having at least one terminal trialkoxysilyl radical; and

b. homogenously blended with said polymer a catalytic amount of a fluoroaliphaticsulfonyl substituted ethylene compound sufficient to cause crosslinking of said vulcanizable polymer to a cured product, wherein the fluoroaliphaticsulfonyl substituted ethylene compound has the formula



wherein R_f is a monovalent saturated fluoroaliphatic radical; Q is a monovalent, non-ionic, electron withdrawing radical at least as electron withdrawing as a benzoyl radical; and Z is an aromatic group or an unsaturated, conjugated heterocyclic organic radical and having a valence on a carbon atom.

4,020,044

METHOD OF INCREASING THE MOLECULAR WEIGHT OF HYDROXYL ENDBLOCKED POLYDIORGANOSILOXANES

Irvin D. Crossan, Homer Township, Midland County, and Louis H. Toporcer, Ingersol Township, Midland County, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 16, 1975, Ser. No. 596,475
Int. Cl.² C08G 77/04
U.S. Cl. 260—46.5 UA **7 Claims**

1. A method of increasing the molecular weight of a hydroxyl endblocked polydiorganosiloxane consisting essentially of mixing the hydroxyl endblocked polydiorganosiloxane where the organic groups are monovalent radicals selected from the group consisting of methyl, phenyl, and 3,3,3-trifluoropropyl, the organic groups being at least 50 percent methyl radicals, and a silane of the formula

in which R is a monovalent radical selected from the group consisting of an alkyl radical of one to four carbon atoms per radical and phenyl radical, the silane being present in an amount sufficient to provide about one mole of silane per mole of silicon-bonded hydroxyl, and thereafter recovering a polydiorganosiloxane gum having a molecular weight higher than the polydiorganosiloxane mixed with the silane and having methylvinylsiloxane units distributed along the chain of the polydiorganosiloxane of increased molecular weight, said methylvinylsiloxane units coupling the polydiorganosiloxane molecules initially mixed with the silane.

4,020,045

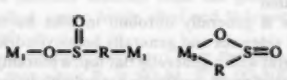
PROCESS FOR CONTROLLING THE MOLECULAR WEIGHT OF AROMATIC POLYCARBONATES

Joseph M. Baggett, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

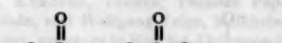
Filed Feb. 26, 1976, Ser. No. 661,672
Int. Cl.² C08G 17/13
U.S. Cl. 260—47 XA **6 Claims**

1. A process for controlling the molecular weight of thermoplastic aromatic polycarbonates having hydroxyl terminated end groups which comprises reacting under interfacial polycarbonate-forming conditions

1. a carbonyl halide,
2. a dihydric phenol or mixtures of dihydric phenols,
3. a catalyst useful to form polycarbonates and
4. a chain terminating amount of a compound having one of the formulas



wherein M_1 is a metal of Group IA, M_2 is a metal of Group IIA, R is



or —O—.

4,020,046

AROMATIC POLYSULPHONE COATED ARTICLE AND BONDED STRUCTURE

Terence King, New Barnet, and John Brewster Rose, Letchworth, both of England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 461,405, April 16, 1974, Pat. No. 3,984,604, which is a continuation-in-part of Ser. No. 381,380, July 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 150,905, June 8, 1971, Pat. No. 3,769,150. This application May 6, 1975, Ser. No. 575,062

Claims priority, application United Kingdom, Apr. 16, 1973, 18183/73; Apr. 16, 1973, 18185/73; Apr. 16, 1973, 18184/73; June 19, 1970, 29907/70; July 15, 1970, 34317/70; Feb. 5, 1971, 4033/71; Nov. 19, 1973, 53582/73

Int. Cl.² C08L *27/12*

U.S. Cl. 260—900 **7 Claims**

1. A method for increasing the molecular weight of aromtic polysulphone comprises heating a thermoplastic aromatic polysulphone having reduced viscosity of at least 0.3 (as measured at 25° C on a solution in dimethyl formamide containing 1 g of polymer in 100 cm^3 of solution) and containing at least 0.2 aromatically bound hydroxyl groups per 100 polymer repeat units at a temperature of 330° C to 450° C in the presence of oxygen.

7. The product obtained by the process of claim 1.

4,020,047

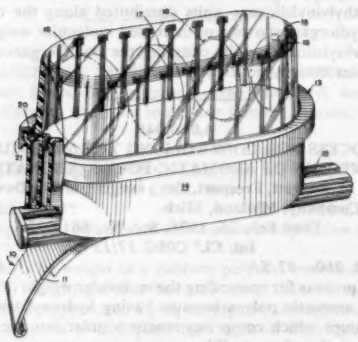
EMERGENCY VEHICLE LIGHT

Oliver John Burland, 252 Bay Point, Naples, Fla. 33940

Filed July 11, 1975, Ser. No. 595,294

Int. Cl.² F21V *9/08*

U.S. Cl. 240—46.59 **1 Claim**



1. In an emergency vehicle light including an elongated base adapted to be mounted on a vehicle roof and equipped with a plurality of longitudinally aligned warning lights mounted atop said base, and an elongated translucent globe mounted on said base and enclosing said lights, the improvement characterized by the fact that

said globe is generally obround in plan having generally straight sidewalls and generally hemicylindrical end walls all integral with a generally flat top, a plurality of horizontally spaced apart, vertically extending ribs on the interior of said walls adapted to receive placards to transmit different visual images than from said lights alone, a plurality of placards mounted between adjacent ribs, the ribs on said sidewalls having a stepped profile in horizontal section to support the vertical edge of an associated placard away from its associated sidewall, each of said sidewall ribs having associated therewith clip means for restraining inward movement of said associated placard, said clip means being integral with said sidewalls and located adjacent the top thereof.

4,020,048

TACKIFIER FOR RUBBER

William H. Harrop, Downington, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 488,379, July 15, 1974, Pat. No. 3,962,156. This application May 12, 1975, Ser. No. 576,540

Int. Cl.² C08L *7/00, 9/02, 9/06, 63/00*

U.S. Cl. 260—51.5 **7 Claims**

1. A process comprising reacting about 0.7 to 1.3 mole parts lower alkyl aldehyde with about 0.50 to 0.95 mole parts of predominantly monosubstituted alkyl, alkoxy, or alkenyl phenol and about 0.50 to 0.05 mole parts of cycloaliphatic polyamine containing at least two primary amine groups in the presence of an acid catalyst.

4,020,049

PROCESS FOR PREPARING POLYESTER RESIN

Verne R. Rinehart, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 667,854, Sept. 14, 1967, abandoned, which is a continuation-in-part of Ser. No. 254,754, Jan. 29, 1963, abandoned. This application Apr. 2, 1971, Ser. No. 130,743

Int. Cl.² C08G *63/22*

U.S. Cl. 260—75 M **16 Claims**

1. The method for the commercial scale production of polyesters which comprises adding commercial scale quantities of ethylene glycol and a free aromatic dicarboxylic acid in the molar ratio of glycol to acid of from 1.7:1 to 1.05:1 to a solvent consisting of a preformed low molecular weight linear condensation polyester of a glycol and a dicarboxylic acid, said polyester having an average degree of polymerization of from 1.4 to 10, heating and reacting the mixture at a temperature above the melting temperature of the low molecular weight linear polyester at a pressure of from about 20 to about 1000 pounds per square inch gauge pressure until a linear condensation polyester resin of said glycol and acid having an average degree of polymerization of from 1.4 to 10 is formed.

4,020,050

METHOD OF PREPARING POLYMER FROM DIANHYDRIDE AND HYDRAZINE OR DIHYDRAZIDE

Karl F. Schimmel, Verona, and Marco Wismer, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

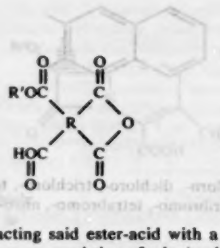
Division of Ser. No. 369,628, June 13, 1973, abandoned. This application Oct. 2, 1974, Ser. No. 511,322

Int. Cl.² C08G *73/08, 73/10*

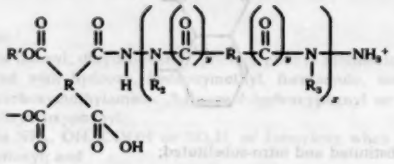
U.S. Cl. 260—78 TF **1 Claim**

1. A method of producing a high temperature polymer comprising:

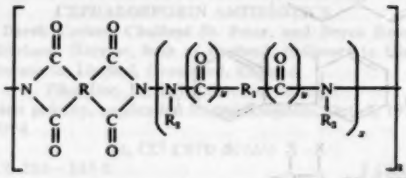
reacting a tetracarboxylic dianhydride with a monofunctional alcohol to form an ester-acid having the structural formula:



reacting said ester-acid with a member selected from the group consisting of a hydrazine and a hydrazide, thereby forming a polysalt having the structural formula:



heating said polysalt to form a high temperature resistant polymer having the structural formula:



wherein R is a tetravalent organic radical having at least 2 carbon atoms, R_1 is a divalent organic radical having at least two carbon atoms, R′ is a monovalent organic radical having 1 to 20 carbon atoms, R_2 and R_3 are selected from the group consisting of alkyl, aryl, aralkyl, cycloalkyl, and hydrogen radicals and x and y are either 1 or 0.

4,020,051

CONTROL OF NITROGEN OXIDE REACTIONS IN OFF-GASES FROM THE DIAZOTIZATION/COUPLING OF AROMATIC AMINES

Frank Edward Herkes, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 25, 1975, Ser. No. 635,058

Int. Cl.² C07C *115/00, 113/00;* **C01B** *21/00;* **B01J** *8/00*

U.S. Cl. 260—140 R **12 Claims**

1. In a process for preparing a 1,3-diaryl triazene by the diazotization and coupling of a primary carboxyclic aromatic monoamine in the liquid phase whereby a residual gas containing one or more nitrogen oxides and unreacted primary carbocyclic aromatic monoamine is separated from the triazene-containing reaction liquid, the improvement comprising conducting said residual gas through a pipeline to a waste-gas disposal system and performing at least one of the following steps: heating the walls of said pipeline during the passage of said residual gas therethrough conducting said residual gas out of said pipeline before a carbocyclic aromatic diazonium nitrate deposits on the walls thereof, and preventing the substantial entry of formation of nitrogen dioxide in said pipeline.

4,020,052

TREATMENT OF AROMATIC AMINES WITH GAS MIXTURES DERIVED FROM THE OXIDATION OF AMMONIA TO EFFECT DIAZOTIZATION/COUPLING

John Kent Detrick, Woodbury, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 25, 1975, Ser. No. 635,059

Int. Cl.² C01B *21/26;* **C07C** *113/00, 115/00*

U.S. Cl. 260—140 R **14 Claims**

1. A method of preparing a 1,3-diaryl triazene comprising, in sequence, catalytically oxidizing ammonia by means of a gas comprising diluted molecular oxygen so as to form a gas mixture comprising a dilute nitrogen oxide component selected from the group consisting of nitrogen dioxide (NO_2) and mixtures of nitrogen dioxide and nitric oxide, said nitrogen oxide component being represented by the formula NO_x wherein x is $(1 + n)$, n being the NO_2 fraction of the nitrogen oxide component; and contacting said gas mixture with a primary carbocyclic aromatic monoamine in the liquid phase so as to result in a monoamine temperature in the range of about from 25° C. to 90° C. during contact, while maintaining at least about 5 percent by weight of unconsumed monoamine.

4,020,053

PHENYLAZO-(N-ALKYLANILINO)-M-TOLUENE SULFONIC ACID OR SULFONAMIDE ACID DYES FOR POLYAMIDE FIBER MATERIALS

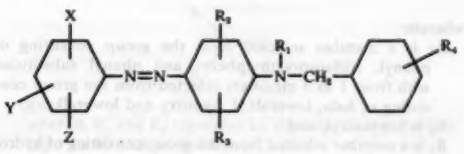
Allan M. Huffman, Lock Haven, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Filed Dec. 2, 1974, Ser. No. 528,692

Int. Cl.² C09B *29/08;* **D06P** *1/06, 1/08, 3/26*

U.S. Cl. 260—205 **6 Claims**

1. A dye of the formula:



wherein:

a. X is a member selected from the group consisting of SO_3M and $SO_2NR_5R_6$ in which:
   1. M is hydrogen, alkali metal, ammonium or hydroxyalkylammonium wherein the alkyl has 3–12 carbon atoms; and
   2. R_5 and R_6 are independently selected from the group consisting of hydrogen, lower alkyl, cyano lower alkyl, phenyl, and hydroxy lower alkyl;

b. Y and Z are members independently selected from the the group consisting of hydrogen, chlorine, bromine, lower alkyl, and lower alkoxy;

c. R_2 and R_3 are members independently selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, chlorine and bromine;

d. R_1 is a member selected from the group consisting of lower alkyl, cyano lower alkyl and N-lower alkyl carbamyl; and

e. R_4 is independently selected from the same group as X, except that when R_4 is SO_3M, X is $SO_2NR_5R_6$ and that when X is SO_3M, R_4 is $SO_2NR_5R_6$.

4,020,054

IMPACT RESISTANT HIGH VINYL POLYDIENE THERMOSETTING COMPOSITIONS CONTAINING FIBROUS SULFUR-CONTAINING ORGANIC POLYMER

Lawrence M. Fodor, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 3, 1975, Ser. No. 592,836
Int. Cl.² C08K *3/34*
U.S. Cl. 260—23.7 M **8 Claims**

1. A thermosetting composition comprising:
1. high vinyl polymer of conjugated diene, said diene having 4–10 carbon atoms per molecule with the polymer having at least 50 percent unsaturation in the form of pendant groups having olefinic unsaturation,
2. silane coupling agent,
3. process aid,
4. organic peroxide curing agent, and
5. filler comprising:
a. inorganic, particulate metal silicate or metal oxide and
b. phenylene sulfide polymer fiber.

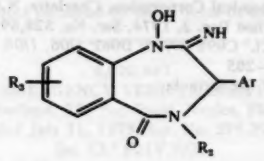
4,020,055

INTERMEDIATES FOR 2-AMINOBENZODIAZEPINE-5-ONES

Richard J. Mohrbacher, Maple Glen, and Philip P. Grous, Philadelphia, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Division of Ser. No. 615,667, Sept. 22, 1975. This application June 23, 1976, Ser. No. 699,093
Int. Cl.² C07D *243/20*
U.S. Cl. 260—239.3 D **1 Claim**

1. A compound having the formula:



wherein:

Ar is a member selected from the group consisting of phenyl, trifluoromethylphenyl and phenyl substituted with from 1 to 3 members selected from the group consisting of halo, loweralkyl, hydroxy and loweralkoxy;

R_2 is loweralkyl; and

R_3 is a member selected from the group consisting of hydrogen, halo, nitro, loweralkoxy, and loweralkyl.

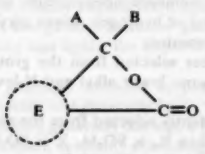
4,020,056

DI-VINYL PHTHALIDES COLOR FORMERS

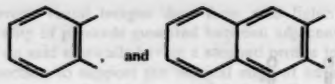
Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio

Filed Apr. 10, 1975, Ser. No. 566,851
Int. Cl.² C07D *307/88*
U.S. Cl. 260—240 D **7 Claims**

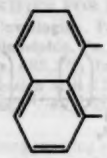
1. A compound represented by the formula:



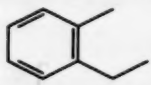
wherein E is



unsubstituted and alkyl-, chloro-, dichloro-, trichloro-, tetrachloro-, bromo-, dibromo-, tribromo-, tetrabromo-, nitro- and dialkylamino-substituted;

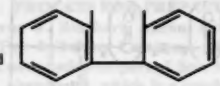


unsubstituted and nitro-substituted;



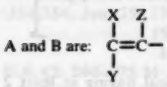
;

and

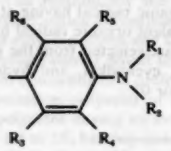


;

A and B are:



X is:



;

Y is: X or hydrogen;

Z is: hydrogen or methyl;

R_1 and R_2 are: hydrogen, alkyl, phenyl, and benzyl, and but R_1 and R_2 are not both phenyl;

R_3, R_4, R_5, and R_6 are: hydrogen, alkyl, phenyl, benzyl, alkoxy, halo, dialkylamino, monoalkylamino, amino, acetylamino; and

wherein alkyl, each occurrence, and alkoxy have one to six carbon atoms.

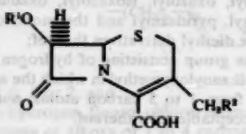
4,020,057

7β-ACYLOXY CEPHALOSPORINS

John G. Gleason, Delran, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

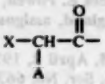
Filed June 18, 1975, Ser. No. 588,096
Int. Cl.² C07D *501/00*
U.S. Cl. 260—243 C **3 Claims**

1. A compound of the formula:



in which:

R^1 is



where:

X is thienyl; dihydrophenyl; phenyl; phenyl monosubstituted with hydroxy, hydroxymethyl, formamido, ureido, carboxymethylamino; 3-fluoro-4-hydroxyphenyl or 3,4-dihydroxyphenyl;

A is NH_2, OH, COOH or SO_3H; or formyloxy when X is phenyl; and

R^2 is acetoxy,

or a non-toxic pharmaceutically acceptable salt thereof.

4,020,058

IMPROVEMENTS IN OR RELATING TO CEPHALOSPORIN ANTIBIOTICS

John Derek Cocker, Chalfont St. Peter, and Derek Ronald Sutherland, Harrow, both of England, assignors to Glaxo Laboratories Limited, Greenford, England

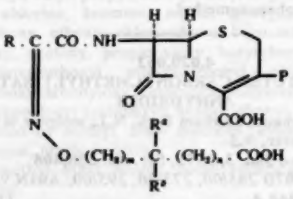
Filed Dec. 16, 1974, Ser. No. 533,315

Claims priority, application United Kingdom, Oct. 3, 1974, 43005/74

Int. Cl.² C07D *501/16*

U.S. Cl. 260—243 C **7 Claims**

1. A compound selected from the group consisting of a cephalosporin antibiotic of the formula:



(I)

wherein R is thienyl or furyl; R^a and R^b are each hydrogen, C_{1-4} alkyl, C_{2-4} alkenyl, C_{3-7} cycloalkyl, phenyl, naphthyl, thienyl, furyl, carboxy, C_{2-5} alkoxycarbonyl or cyano, or R^a and R^b together with the carbon atom to which they are attached form a C_{3-7} cycloalkylidene or cycloalkenylidene group; *m* and *n* are each 0 or 1 such that the sum of *m* and *n* is 0 or 1; and P is hydrogen, or the physiologically acceptable salts, esters, 1-oxides and solvates thereof.

4,020,059

PROCESS FOR PREPARING TERTIARY AMINES

Isamu Maeda; Hiroshi Koike, both of Takatsuki, and Takashi Ohara, Nishinomiya, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Japan

Filed June 2, 1975, Ser. No. 582,822

Int. Cl.² C07D *295/00*

U.S. Cl. 260—243 B **16 Claims**

1. A process for preparing tertiary amines which comprises in absence of added formic acid reacting a carbonyl compound with a formyl derivative of a secondary amine at a temperature of 200° to 300° C. in the presence of at least one compound selected from the group consisting of water and lower aliphatic alcohols containing 1 to 4 carbon atoms, the amount of said at least one compound selected from the group consisting of water and lower alcohols containing 1 to 4 carbon atoms being 1 to 10 mols per mol of the carbonyl compound, said carbonyl compound being selected from the group consisting of:

1. aliphatic aldehydes of the general formula

wherein R_2 is an aliphatic radical containing 1 to 40 carbon atoms,

2. alicyclic aldehydes of the general formula

wherein R_2 is an alicyclic radical containing 5 to 20 carbon atoms,

3. aromatic aldehydes of the general formula

wherein R_2 is an aromatic radical,

4. aliphatic ketones of the general formula

wherein R_1 and R_2 represent an aliphatic radical containing 1 to 20 carbon atoms,

5. aliphatic-aromatic ketones of the general formula

wherein R_1 is an aliphatic radical containing 1 to 20 carbon atoms and R_2 is an aromatic radical,

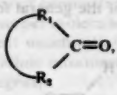
6. aliphatic-heterocyclic ketones of the general formula

wherein R_1 is an aliphatic radical containing 1 to 20 carbon atoms and R_2 is a heterocyclic radical,

7. aromatic ketones of the general formula

wherein R_1 and R_2 represent an aromatic radical, and

8. alicyclic ketones of the general formula



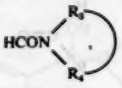
wherein R_1–R_2 is a biradical containing 4 to 40 carbon atoms,

said formyl derivative of a secondary amine being selected from

i. formyl derivatives of aliphatic secondary amines of the general formula

wherein R_3 and R_4 represent an aliphatic radical containing 1 to 20 carbon atoms, and

ii. formyl derivatives of cyclic secondary amines of the general formula



wherein R_3–R_4 represents a biradical containing 3 to 20 carbon atoms, all of said aliphatic and alicyclic radicals and alcohols being saturated.

4,020,060

7-[α-AMINO-ω-(3,4-METHYLENEDIOXYPHENYL-)ACYLAMIDO]CEPHALOSPORANIC ACID DERIVATIVES

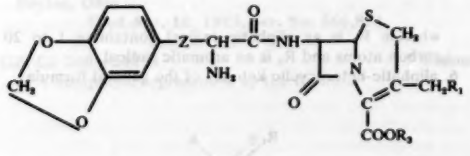
Raymond C. Erickson, and Ronald E. Bambury, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed July 22, 1975, Ser. No. 598,152

Int. Cl.² C07D *501/36, 501/22, 501/20*

U.S. Cl. 260—243 C **11 Claims**

1. A 7-[α-amino-ω-(3,4-methylenedioxyphenyl-)acylamido]cephalosporanic acid having the formula:



wherein

Z is selected from the group consisting of a sigma bond, methylene and ethylene;

R_1 is selected from the group consisting of hydrogen, hydroxy, acetoxy, pyridinium and —S—R_2;

R_2 is a heterocycle selected from the group consisting of pyrazolyl, imidazolyl, triazolyl, tetrazolyl, thiazolyl, isothiazolyl, thiadiazolyl, oxazolyl, isoxazolyl, oxadiazole, pyrimidinyl, pyrazinyl, pyridazinyl and the mono or dimethyl and mono or diethyl derivatives thereof;

R_3 is selected from the group consisting of hydrogen, formyloxymethyl and alkanoyloxymethyl in which the alkanoyl group contains from 1 to 5 carbon atoms; and the pharmaceutically acceptable salts thereof.

4,020,061

3-OXOMETHYL-2-(1-NITRO-2-OXO-ETHYLIDENE)-TETRAHYDRO-2H-1,3-THIAZINES

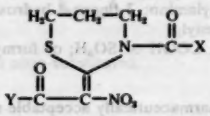
Steven A. Roman, Oakdale, Calif., and James E. Powell, Rodmersham Green near Sittingbourne, England, assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 564,258, April 2, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,316

Int. Cl.² C07D *279/06*

U.S. Cl. 260—243 R **1 Claim**

1. A compound of the formula:



wherein X and Y each is R, R—O— or R—S—, R containing up to 30 carbon atoms and being alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, haloalkyl, haloalkenyl, mono- and poly-(alkoxy)alkyl, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl; 2,4-dichlorophenoxymethyl, 2-methyl-4-chlorophenoxymethyl, 2,4,5-trichlorophenoxy-methyl; phenyl or phenalkyl, or any of these substituted on the ring by one to two of one or more of halogen, nitro, cyano, alkyl, phenyl, alkoxy or phenoxy; is aminoalkyl, $(CH_2)_mNR^1R^2$, wherein m is 1 or 2, R^1 and R^2 is alkyl, alkenyl, cycloalkyl, phenyl or phenalkyl; or is $(CH_2)_nR^3$, wherein n is zero, 1 or 2, and R^3 is heterocyclic moiety selected from furanyl, tetrahydrofuranyl, dioxolanyl, thienyl, thiopyranyl, pyridinyl, pyrrolidinyl, morpholinyl and their -methyl and -ethyl counterparts, with the proviso that one or both of X and Y is 2,4-dichloro-, 2-methyl-4-chloro- or 2,4,5-trichloro-phenoxymethyl.

4,020,062

N-(SUBSTITUTED CARBONYLMETHYL) ISATOIC ANHYDRIDES

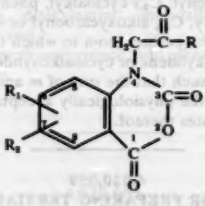
Goetz E. Hardtmann, Florham Park, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Jan. 3, 1975, Ser. No. 538,408

Int. Cl.² C07D *265/00, 273/00, 295/00;* **A01N** *9/00*

U.S. Cl. 260—244 A **11 Claims**

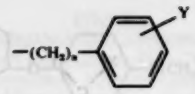
1. A compound of the formula:



wherein

R_1 and R_2 are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms or R_1 and R_2 together form 7,8-methylenedioxy,

R is alkyl of 1 to 5 carbon atoms or



n is 0, 1 or 2, and
Y is hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms.

4,020,063

OXADIAZEPINE CATIONIC DYESTUFFS

Uwe Mayer, Cologne, and Karl-Heinz Schündehütte, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

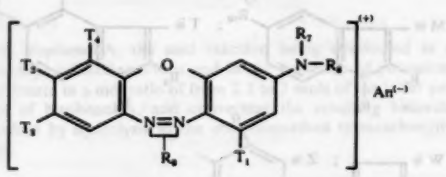
Filed Aug. 24, 1973, Ser. No. 391,298

Claims priority, application Germany, Aug. 24, 1972, 2241626

Int. Cl.² C07D *273/06*

U.S. Cl. 260—247.5 H **7 Claims**

1. Cationic dyestuff of the formula



wherein

R_7 and R_8 independently of one another are hydrogen; methyl; ethyl; propyl; methyl, ethyl or propyl substituted by chlorine, bromine, nitrile, thiocyanate, hydroxyl, methoxy, ethoxy, chloroethoxy, bromoethoxy, cyanoethoxy, acetoxy, propionyloxy, butyryloxy, benzoyloxy, methoxycarbonyl, ethoxycarbonyl, phenoxycarbonyl, methoxycarbonyloxy, ethoxycarbonyloxy, or phenoxycarbonyloxy; cyclohexyl; benzyl; phenyl; or phenyl substituted by methyl, ethyl methoxy, ethoxy, phenyloxy, halogen, nitrile or nitro;

R_9 is methyl, ethyl, propyl, butyl, aminocarbonylethyl or benzyl;

T_1 and T_4 independently of one another are hydrogen, chlorine, methyl, methoxy or ethoxy;

T_2 and T_3 independently of one another are hydrogen, fluorine, chlorine, bromine, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, isoamyl, cyclohexyl, β-chloroethyl, β-cyanoethyl, β-hydroxyethyl, β- or γ-hydroxypropyl, benzyl, phenyl, hydroxyl, methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, β-methoxyethoxy, β-ethoxyethoxy, benzyloxy, 2-phenylethyloxy, phenylpropyl-(2,2)-oxy, phenoxy, methylthio, ethylthio, propylthio, benzylthio, phenylthio, formyl, acetyl, n-propionyl, n-butyryl, benzoyl, benzylcarbonyl, methoxycarbonyl, ethoxycarbonyl, acetylamino, ureido, N-methylureido, carbamoyl, N-methylcarbamoyl, N,N-dimethylcarbamoyl, sulphamoyl, N-methylsulphamoyl, N-ethylsulphamoyl, N,N-dimethylsulphamoyl, N,N-diethylsulphamoyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, methylphenoxy, chlorophenoxy or methoxyphenoxy; and

$An^{(-)}$ is an anion.

4,020,064

3-[SUBSTITUTED-2-(METHYLAMINO) PHENYL]-4-[2-OXO-2-(HETERO-CYCLIC) ETHYL]-5-SUBSTITUTED-1,2,4-TRIAZOLES

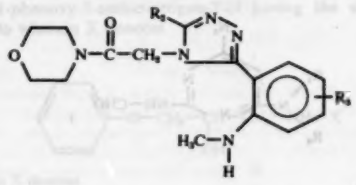
Peter C. Wade, Pennington, N.J., and Berthold Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 582,549, May 30, 1975, Pat. No. 3,969,366. This application Apr. 26, 1976, Ser. No. 680,315

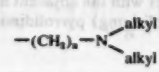
Int. Cl.² C07D *413/02*

U.S. Cl. 260—247.5 E **6 Claims**

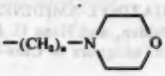
1. A compound of the formula



wherein R_5 is hydrogen, alkyl of 1 to 4 carbons, trifluoromethyl, phenyl, benzyl,



wherein each alkyl is of 1 to 4 carbons or



n is an integer from 1 to 4; and R_3 is hydrogen, halogen, nitro, trifluoromethyl, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbon, or alkylthio of 1 to 4 carbons; and a pharmaceutically acceptable salt thereof.

4,020,065

1,3,4-THIADIAZOLYL-(2)-HEXAHYDRO-TRIAZINONES

Paul Rathgeb, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

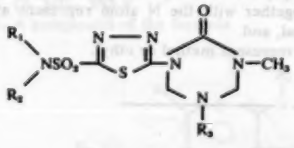
Filed Apr. 1, 1975, Ser. No. 564,017

Claims priority, application Switzerland, Apr. 3, 1974, 4689/74

Int. Cl.² C07D *251/08*

U.S. Cl. 260—248 NS **6 Claims**

1. A 1,3,4-thiadiazolyl-(2)-hexahydrotriazinone compound of the formula



wherein

R_1 and R_2 each independently represent C_1–C_4 alkyl, or together with the nitrogen atom carrying them the pyrrolidino, piperidino, hexahydroazepino or morpholino radical, and

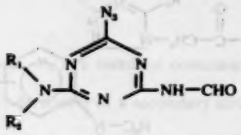
R_3 represents C_1–C_7 alkyl, C_3–C_4 alkenyl, C_3 alkynyl, alkoxyalkyl having C_1–C_4 alkyls or alkylthioalkyl having C_1–C_4 alkyls, or benzyl.

4,020,066
FORMYLAMINO-2-TRIAZINES

René Bosshard, Birsfelden, and Hans U. Brechbühler, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,124
Claims priority, application Switzerland, Sept. 12, 1974, 12419/74; Aug. 15, 1975, 10662/75
Int. Cl.² C07D 251/66
U.S. Cl. 260—249.6 14 Claims

1. A compound of the formula I



(I)

wherein

R_1 represents a hydrogen atom or a C_1–C_4-alkyl radical, and

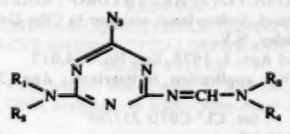
R_2 represents a C_1–C_4-alkyl, C_5–C_6-cycloalkyl, C_3–C_4-alkenyl, C_3–C_5-alkynyl or methoxy-(C_1–C_4)-alkyl radical, or R_1 and R_2 together with the adjacent nitrogen atom represent a (heterocyclic ring) pyrrolidino radical.

4,020,067
TRIAZINYL-AMIDINES

René Bosshard, Birsfelden, and Hans U. Brechbühler, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,125
Claims priority, application Switzerland, Sept. 12, 1974, 12418/74; Aug. 15, 1975, 10661/75
Int. Cl.² C07D 251/66
U.S. Cl. 260—249.6 15 Claims

1. A compound of the formula I



(I)

wherein

R_1 represents a hydrogen atom or a C_1–C_4-alkyl radical, and

R_2 represents a C_1–C_4-alkyl, C_5–C_6- cycloalkyl, C_3–C_4-alkenyl, C_3–C_5-alkynyl or methoxy (C_1–C_4)-alkyl radical, or R_1 and R_2 together with the N atom represent a pyrrolidino radical, and

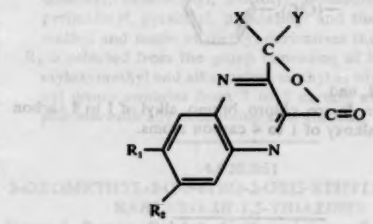
R_3 and R_4 each represent methyl or ethyl.

4,020,068
CHROMOGENIC FUROQUINOXALINES

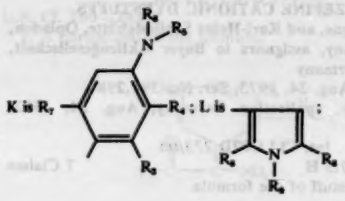
Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio

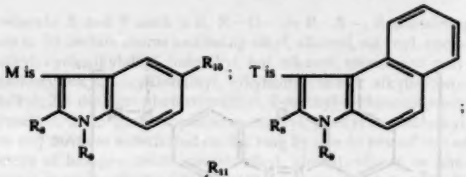
Continuation-in-part of Ser. No. 468,112, May 8, 1974, abandoned. This application Feb. 28, 1975, Ser. No. 554,257
Int. Cl.² C07D 491/04
U.S. Cl. 260—250 Q 6 Claims

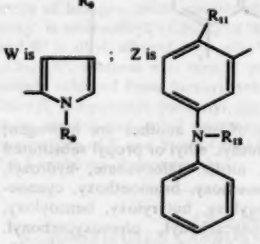
1. A chromogenic compound represented by the formula:



wherein X is one of K, L, M, T, W and Z and Y is one of K, L, M and T; and







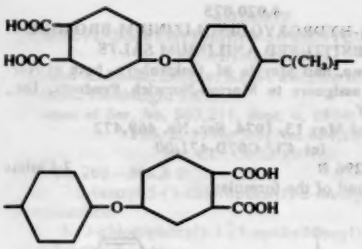
R_1, R_2, R_3, R_4 and R_7 are hydrogen, chlorine, nitro, alkyl, alkoxy, and dialkylamino, wherein alkyl and alkoxy are less than seven carbon atoms; $R_5$and R_6 hydrogen, phenyl, benzyl, and alkyl, wherein alkyl is less than seven carbon atoms and, additionally, when one of R_5 and R_6 is phenyl, alkyl and alkoxy wherein alkyl and alkoxy are less than seven carbon atoms; R_9 is hydrogen, phenyl and alkyl wherein alkyl is less than seven carbon atoms; R_{10} is hydrogen, alkyl and alkoxy wherein alkyl and alkoxy are less than seven carbon atoms; R_{11} is alkoxy less than seven carbon atoms; R_{12} is hydrogen, methyl and ethyl.

4,020,069
PREPARATION OF AROMATIC TETRACARBOXYLIC ACIDS

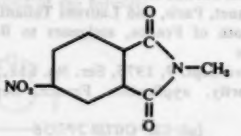
Donald S. Johnson, Scotia, and Howard M. Relles, Rexford, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed July 25, 1975, Ser. No. 598,950
Int. Cl.² C07C 65/14
U.S. Cl. 260—520 E 1 Claim

1. The process of making a tetracarboxylic acid of the formula



which comprises (1) simultaneously effecting reaction under substantially anhydrous conditions and in an inert atmosphere at a temperature within the range of from about 110° to 200° C between a nitrophthalimide of the formula



with bisphenol-A, the said reaction being conducted in a dimethyl sulfoxide solvent and in the presence of potassium carbonate in a mol ratio of from 2.1 to 3 mols of the latter per mol of bisphenol-A, and converting the resulting bisimide product by hydrolysis to the abovedescribed tetracarboxylic acid.

4,020,070

ALKYL-SUBSTITUTED 6-CHLORO-2-THIOURACILS

Kailash Kumar Gauri, Lentfoehrden, Germany, assignor to Robugen GmbH, Esslingen (Neckar), Germany

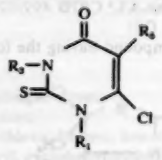
Continuation-in-part of Ser. No. 369,232, June 12, 1973, abandoned. This application Nov. 6, 1975, Ser. No. 629,535

Claims priority, application Germany, June 12, 1972, 2228484

Int. Cl.² C07D *239/10*

U.S. Cl. 260—251 R **11 Claims**

1. A 2-thio-6-chlorouracil having the formula:



wherein R_1 is hydrogen, lower alkyl or alkenyl of 1 to 4 carbon atoms, phenyl or phenyl-substituted lower alkyl, and R_2 and R_3 are the same or different and are selected from the group consisting of lower alkyl of 1 to 4 carbon atoms.

4,020,071

DERIVATIVES OF 1-PHENOXY-3-AMINO-PROPAN-2-OL

Thomas Raabe, Rodenbach; Otto Gräwinger, Frankfurt am Main; Josef Scholtholt, Mittelbuchen; Rolf-Eberhard Nitz, Bergen-Enkheim, and Eckhard Schraven, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Frankfurt am Main-Fechenheim, Germany

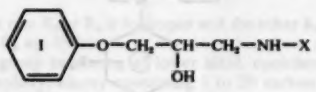
Filed Dec. 10, 1974, Ser. No. 531,324

Claims priority, application Netherlands, Dec. 20, 1973, 7369042

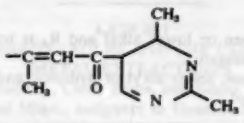
Int. Cl.² C07D *239/06*

U.S. Cl. 260—256.4 R **11 Claims**

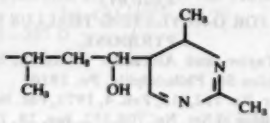
1. 1-phenoxy-3-amino-propan-2-ol having the structural formula wherein X denotes



wherein X denotes



or



and the phenyl radical I can be mono-, di- or tri-substituted by alkyl having 1 to 4 C atoms, alkenyl having up to 6 C atoms, alkynyl having up to 6 C atoms, cycloalkyl having a ring of 5 to 8 C atoms, cycloalkenyl having a ring of 5 to 8 C atoms, alkoxy having up to 8 C atoms, alkenyloxy having up to 5 C atoms, alkylnyloxy having up to 5 C atoms, phenyl, chlorine or bromine, or the radical $—NR_1R_2$, or wherein R_1 represents alkyl having 1 to 4 C atoms or acyl of an aryl or alkyl carboxylic acid having up to 11 C atoms, and R_2 represents hydrogen or alkyl having up to 4 C atoms, or a pharmaceutically acceptable acid addition salt thereof.

4,020,072

5-AMINOMETHYL-1H-PYRAZOLO[3,4-b]PYRIDINES

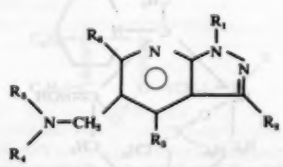
Hans Hoehn, Tegernheim, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 4, 1976, Ser. No. 682,930

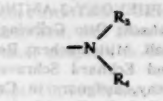
Int. Cl.² C07D *471/04*

U.S. Cl. 260—293.6 **16 Claims**

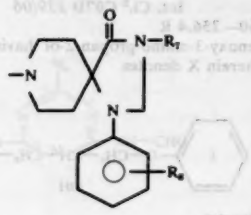
1. A compound of the formula



wherein R_1 and R_2 each is hydrogen, lower alkyl or phenyl;
R_3 is hydrogen, lower alkyl, hydroxy or halogen;
R_4 and R_5 each is hydrogen, lower alkyl, phenyl, di(lower alkyl)amino-lower alkyl or together the group



is piperidino, pyrrolidino, piperazinyl, lower alkylpiperidino, lower alkylpiperazinyl, (hydroxy-lower alkyl)-piperazinyl or



wherein

R_7 is hydrogen or lower alkyl and R_8 is hydrogen, lower alkyl or halogen;

R_9 is hydrogen, lower alkyl or hydroxy; and acid addition salts thereof.

4,020,073

PROCESS FOR O-ACYLATING THALLUS SALTS OF 2-PYRIDONE

Edward C. Taylor, and Alexander McKillop, both of 1500 Spring Garden St., Philadelphia, Pa. 19101

Division of Ser. No. 112,815, Feb. 4, 1971, Pat. No. 3,832,381, which is a division of Ser. No. 700,352, Jan. 25, 1968, Pat. No. 3,626,018. This application May 21, 1974, Ser. No. 471,926

Int. Cl.² C07D *213/64*

U.S. Cl. 260—294.8 R **9 Claims**

1. A process for O-acylating in a suitable solvent a lactam, said lactam being a 2-pyridone, comprising treating the thallous salt of said 2-pyridone with an acyl halide, said acyl being acetyl, benzoyl, tosyl, 3,5-dinitrobenzoy, mesitoyl, pivaloyy, or p-anisoyl.

4,020,074

NITROLAMINES

Camillo Corvi Mora, Milan, Italy, assignor to Camillo Corvi S.p.A., Piacenza, Italy

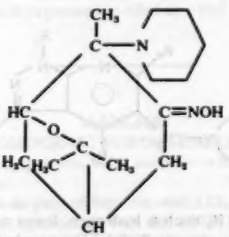
Division of Ser. No. 378,008, July 10, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 611,333

Claims priority, application Italy, July 14, 1972, 27021/72

Int. Cl.² C07D *405/04*

U.S. Cl. 260—293.58 **2 Claims**

1. A nitrolamine selected from the group consisting of a compound of the formula



and the hydrochloride thereof.

4,020,075

2-BROMO-1-HYDROXYQUINOLIZINIUM BROMIDE SUBSTITUTED ANILINIUM SALTS

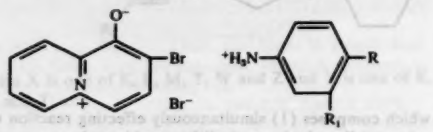
Robert J. Alaimo, and Marvin M. Goldenberg, both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 13, 1974, Ser. No. 469,472

Int. Cl.² C07D *471/00*

U.S. Cl. 260—296 B **7 Claims**

1. A compound of the formula:



wherein R is methoxy, ethoxy, phenoxy or allyloxy and R_1 is hydrogen or methoxy.

4,020,076

NOVEL PHOSPHORYLOXY-THIAZOLES

Jacques Perronnet, Paris, and Laurent Taliani, Les Pavillons-sous-Bois, both of France, assignors to Roussel-UCLAF, Paris, France

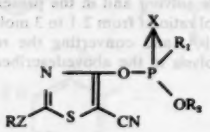
Filed Sept. 9, 1975, Ser. No. 611,710

Claims priority, application France, Sept. 20, 1974, 74.31841

Int. Cl.² C07D *277/56*

U.S. Cl. 260—302 E **18 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, cycloalkyl of 3 to 8 carbon atoms and benzyl optionally substituted with 1 to 2 members of the group consisting of halogen, methyl and methoxy, R_1 is selected from the group consisting of alkyl an alkoxy of 1 to 3 carbon atoms, R_2 is alkyl of 1 to 3 carbon atoms and X and Z are individually selected from the group consisting of oxygen and sulfur.

4,020,077

ANTIBIOTICS

Martin Christopher Cook, Chalfont St. Peter, and Brian Laundon, Northolt, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

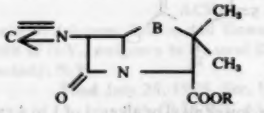
Division of Ser. No. 377,247, July 9, 1973, Pat. No. 3,974,150. This application May 21, 1976, Ser. No. 688,778

Claims priority, application United Kingdom, July 21, 1972, 34298/72

Int. Cl.² C07D *499/02*

U.S. Cl. 260—306.7 C **3 Claims**

1. A penicillin compound having the formula



wherein R is a conventional carboxyl blocking group; and B is >S or >S 0.

4,020,078
3-BENZYL-2-METHYLIMINO-5-PHENYL-DELTA-4-1,3,4-THIADIAZOLINES

Norman A. Dahle, Lenexa, Kans., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Division of Ser. No. 503,211, Sept. 4, 1974. This application Feb. 2, 1976, Ser. No. 654,136
Int. Cl.² C07D *285/12*
U.S. Cl. 260—306.8 D 12 Claims

1. 3-benzyl-5-(3-chlorophenyl)-2-methylimino-Δ^4-1,3,4-thiadiazoline.

2. 5-(3-chlorophenyl)-3-(3-methylbenzyl)-2-methylimino-Δ^4-1,3,4-thiadiazoline.

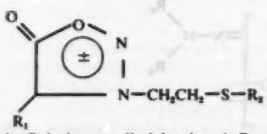
3. 5-(3-chlorophenyl)-3-(4-methylbenzyl)-2-methylimino-Δ^4-1,3,4-thiadiazoline.

4,020,079
ANTI-INFLAMMATORY SYDNONES

Richard E. Ray, Morton Grove, and Hans A. Wagner, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Aug. 1, 1974, Ser. No. 493,930
Int. Cl.² C07D *271/04*
U.S. Cl. 260—307 A 4 Claims

1. A compound of the formula



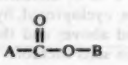
wherein R_1 is lower alkyl having 1–7carbon atoms inclusive and R_2 is cycloalkyl having 5–8carbon atoms inclusive or adamantyl.

4,020,080
OXADIAZOLYLPHENYL AROMATIC ESTER COMPOUNDS AND THEIR USE AS ULTRAVIOLET STABILIZER IN ORGANIC COMPOSITIONS

Gether Irick, Jr., and Charles A. Kelly, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

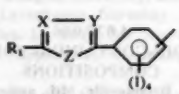
Filed July 1, 1974, Ser. No. 484,844
Int. Cl. C07d *271/10*
U.S. Cl. 260—307 G 9 Claims

1. A compound having the formula



wherein

A is a member of the group comprising members having the structure



wherein

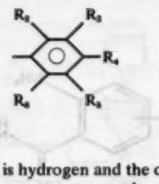
X and Y are a nitrogen atom;

Z is an oxygen atom;

R_1 is hydrogen, chloro, bromo, lower alkyl, chloro substituted lower alkyl, cyclohexyl, phenyl, alkoxy containing 1 to 20 carbon atoms, cyano, dimethyl substituted amino and phenyl substituted with not more than two members of the group consisting of chloro, phenyl, cyano, lower alkyl, and alkoxy containing 1 to 20 carbon atoms;

l is the same as R_1 and is present on all positions of the benzenoid ring, except the carbon atom attached to the Y substituent and the carbon atom attached to the carboxyl group connecting the heterocyclic aromatic A group with the aromatic B group, said carboxyl connecting group is attached to the benzenoid ring in either the meta or para position from the carbon atom connected to the Y substituent; and

B is a group having the formula



wherein

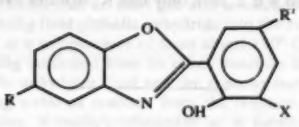
at least one R_2 or R_6 is hydrogen and the other R_2, R_3, R_4, R_5 and R_6 are hydrogen, or not more than three members of the group consisting of lower alkyl, cyclohexyl, phenyl, phenyloxy, alkoxy containing 1 to 20 carbon atoms, hydroxy, nitrile, chloro and bromo.

4,020,081
CERTAIN BENZOXAZOLES AND THE USE THEREOF AS METAL EXTRACTANTS

Kenneth D. MacKay, Circle Pines, and Edgar R. Rogier, Hopkins, both of Minn., assignors to General Mills Chemicals, Inc., Minneapolis, Minn.

Filed Oct. 25, 1974, Ser. No. 518,011
Int. Cl.² C07D *263/56*
U.S. Cl. 260—307 D 11 Claims

1. A compound of the structure



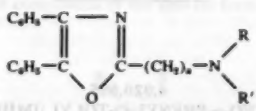
where R is hydrogen or alkyl having from 1 to 20 carbon atoms, R′ is hydrogen, chlorine or alkyl having from 1 to 20 carbon atoms, X is hydrogen or chlorine, the total number of carbon atoms in R and R′ is 6 to 40 and one of R and R′ must be alkyl of at least 6 carbon atoms.

4,020,082
2-AMINOMETHYL- AND 2-(2-AMINOETHYL)-SUBSTITUTED 4,5-DIPHENYLOXAZOLES

Enzo Marchetti, Via Casilina 125, Rome, Italy

Continuation-in-part of Ser. No. 117,117, Feb. 19, 1971, abandoned. This application Aug. 5, 1975, Ser. No. 602,097
Claims priority, application Italy, Feb. 21, 1970, 20946/70
Int. Cl.² C07D *263/32*, *413/06*
U.S. Cl. 260—307 R 6 Claims

1. A compound of the formula:



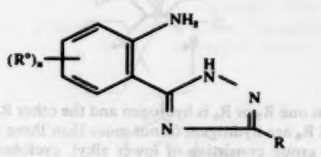
or a pharmaceutically acceptable salt thereof, wherein *n* is the integer 1 or 2 and R and R′ are the same or different and represent hydrogen, alkyl of 1 to 4 carbon atoms, hydroxyalkyl of 1 to 4 carbon atoms, dialkylaminoalkyl wherein the alkyl is of 1 to 4 carbon atoms and carbalkoxy wherein the alkyl is of 1 to 4 carbon atoms.

4,020,083
5-(2-AMINOPHENYL)-S-TRIAZOLES

Faizulla G. Kathawala, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed July 8, 1975, Ser. No. 594,125
Int. Cl.² C07D 249/08
U.S. Cl. 260—308 R 3 Claims

1. A compound of the formula:



wherein

R° is hydrogen, halo selected from the group consisting of bromo, chloro and fluoro, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms or CF_3 or two adjacent R° together form methylenedioxy,

R is hydrogen or alkyl of 1 to 4 carbon atoms, and

n is 1 or 2,

or a pharmaceutically acceptable acid addition salt thereof, provided that

i. when *n* is 1, and one of R° and R signifies hydrogen, the other signifies other than hydrogen,

ii. when *n* is 1, and R signifies alkyl of 1 to 4 carbon atoms, then R° signifies other than hydrogen, and

iii. when *n* is 2, then only one R° signifies hydrogen.

4,020,084
CYCLIC AMINALS OF AROMATIC ALDEHYDES

Jurgen Hocker, Cologne, and Rudolf Merten, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 9, 1973, Ser. No. 414,482
Claims priority, application Germany, Nov. 11, 1972, 2255290
Int. Cl.² C07D 249/00
U.S. Cl. 260—308 A 2 Claims

1. 2-Hydroxy-4-[4-methyl-5-phenyl-triazol-(2)-yl]-(1,3-diphenyl-2-imidazolidinyl)-benzene.

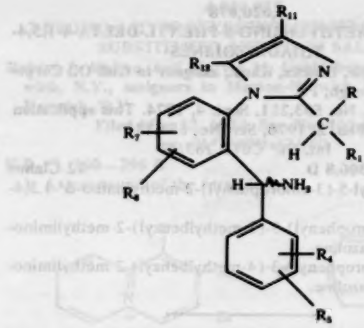
2. 2-hydroxy-4-[2H-naphto [1,2-d]-triazol-(2)-yl]-(1,3-diphenyl-2-imidazolidinyl)-benzene.

4,020,085
1-(α-AMINO-α-PHENYL-O-TOLYL)IMIDAZOLES

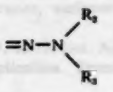
Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 475,459, June 3, 1974, Pat. No. 3,970,666. This application Apr. 28, 1976, Ser. No. 681,184
Int. Cl.² C07D 233/64, 233/58
U.S. Cl. 260—309 6 Claims

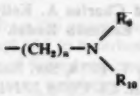
1. A compound of the formula:



wherein R and R_1 taken separately are each hydrogen or when taken together represent a group of the formula:



in which R_2 is hydrogen or alkyl of 1 to 3 carbon atoms, inclusive and R_3 is alkyl as defined above; R_4, R_5, R_6, and R_7 are each hydrogen, alkyl as defined above, halo, nitro or trifluormethyl; R_{11} is hydrogen, alkyl as defined above, hydroxymethyl, or a dialkylaminoalkyl of the formula:



in which R_9 and R_{10} are each alkyl as defined above and *n* is a whole number from 1 to 3, inclusive; and R_{12} is hydrogen, alkyl as defined above, cyclopropyl, hydroxymethyl or dialkylaminoalkyl as defined above; and the pharmacologicaly acceptable acid addition salts thereof.

4,020,086
HYDANTOIN-CONTAINING POLYTHIOL COMPOSITIONS

Charles R. Morgan, Brookeville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 461,207, April 15, 1974, Pat. No. 3,945,982. This application Sept. 18, 1975, Ser. No. 614,576
Int. Cl.² C07D 233/72
U.S. Cl. 260—309.5 2 Claims

1. A polythiol of the formula:

wherein *m* and *n* are each at least 1 and *m* and *n* are 2 to 22 and R_3 is a polyvalent organic radical member free of reactive carbon-to-carbon unsaturation and is selected from the group consisting of aryl, aralkyl, cycloalkyl, and alkyl groups each of up to 16 carbon atoms and mixtures thereof.

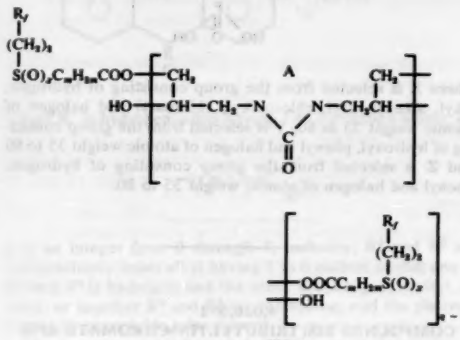
4,020,087

N-IMIDAZOLIDINONE PERFLUOROALKYLCARBOXYLIC ACID ESTER

Armin Hiestand, Binningen, and Horst Jäger, Bettingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 436,553, Jan. 25, 1974, Pat. No. 3,914,225. This application Mar. 3, 1976, Ser. No. 663,186
Claims priority, application Switzerland, Feb. 2, 1973, 1562/73
Int. Cl.² C07D 233/34
U.S. Cl. 260—309.7 6 Claims

1. A perfluoroalkylcarboxylic acid ester of the formula



wherein R_f represents a perfluoroalkyl radical with 4 to 18 carbon atoms, A represents a radical of the formula

wherein R_1 and R_2 represent hydrogen or methyl, B is [—O—] or [—OH Cl—], m is a whole number from 1 to 3, q is 1 or 2 and x is 0, 1 or 2, with x being 0 or 1 if m is 1.

4,020,088

CONDITIONING OF PERHALOGENO-COPPER PHTHALOCYANINES

Diether Wessling, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 14, 1975, Ser. No. 621,798
Claims priority, application Germany, Oct. 16, 1974, 2449148
Int. Cl.² C09B 47/04
U.S. Cl. 260—314.5 2 Claims

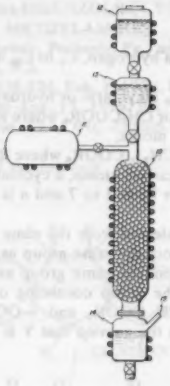
1. Process for the preparation of a perhalogenocopper phthalocyanine pigment in granular form, characterised in that a perhalogeno-copper phthalocyanine crude pigment having a solids content of about 30 to 45% is introduced into 50 to 150% by weight relative to dry pigment of an aromatic solvent in which is suspended 0.1 to 10% by weight relative to dry pigment of a long-chain alcohol-sulphate, the mixture is heated to 100° to 150° C under pressure, the granules are filtered off and the solvent is washed out or distilled off in steam.

4,020,089

METHOD FOR MAKING N-ALKYLPHTHALIMIDES

Ronald L. Markezich, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 1, 1975, Ser. No. 592,190
Int. Cl.² C07D 209/34
U.S. Cl. 260—326 R 1 Claim



1. A continuous method for making N-methylphthalimide which comprises,

1. introducing a gaseous mixture consisting essentially of methylamine and an inert gas into a reaction zone,
2. gravitating fluid phthalic anhydride into the reaction zone of (1) at a temperature of from about 150° C to 500° C,
3. allowing sufficient time to effect reaction between the phthalic anhydride fluid and the gaseous methylamine
4. venting water of reaction from the reaction zone while collecting N-methylphthalimide as it forms therefrom, where the gaseous mixture of step 1 is maintained at a rate which is sufficient to provide at least a slight excess of methylamine in the reactor at all times.

4,020,090

ORGANOTIN COMPOUNDS

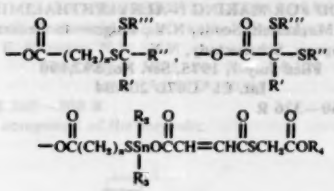
John Desmond Collins, Albrighton; Harold Coates, Wombourn, and Iftikhar Hussain Siddiqui, Birmingham, all of England, assignors to Albright & Wilson Limited, West Midlands, England

Continuation-in-part of Ser. No. 308,018, Nov. 20, 1972, abandoned. This application Nov. 19, 1974, Ser. No. 525,119
Claims priority, application United Kingdom, Nov. 19, 1971, 53892/71
Int. Cl.² C07F 7/22
U.S. Cl. 260—429.7 35 Claims

1. Chemical compounds of the general formula

wherein R and R_1 are individually selected from the group consisting of alkyl groups containing between 1 and 12 carbon atoms, cycloalkyl and phenyl groups;

X is a group of the formula



wherein R′ is a hydrogen, C_1 to C_{20} alkyl, cycloalkyl, aryl group

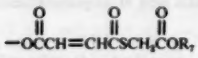
R″ is a C_1 to C_{20} alkyl, aryl or hydroxyphenyl or methoxyphenyl group or CH_2COOR_3 where R_3 is an alkyl group of 1 to 8 carbon atoms;

R‴ is R_4 or is $(CH_2)_n COOR_4$ where R_4 is an alkyl group of from 1 to 20 carbon atoms, a cycloalkyl or an aryl group, *m* is an integer from 3 to 7 and *n* is an integer from 1 to 4;

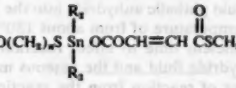
R_2 and R_3 are selected from the same group as R;

R_4 is selected from the same group as R′;

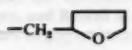
Y is selected from the same group as X or a member selected from the group consisting of $-S(CH_2)_nCOOR_7$, $-OOCCH=CH\ COOR_7$ and $-OOCCH=CH\ COSCH_2COOR_7$, with the proviso that Y is



when X is



where R_7 is an alkyl group of from 1 to 20 carbon atoms, a cycloalkyl or phenyl group or a group of the formula



4,020,091
CHELATION

Edward G. Budnick, Scotch Plains, N.J., assignor to Plains Chemical Development Co., Scotch Plains, N.J.

Division of Ser. Nos. 505,471, Oct. 28, 1965, abandoned, and Ser. No. 813,384, Feb. 28, 1969, and a continuation-in-part of Ser. No. 485,624, Sept. 7, 1965, Pat. No. 3,471,406, Ser. No. 482,257, Aug. 23, 1965, Pat. No. 3,471,552, and Ser. No. 818,802, April 23, 1969, Pat. No. 3,892,676, which is a division of Ser. No. 485,624,. This application Apr. 30, 1970, Ser. No. 33,513

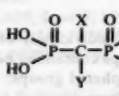
The portion of the term of this patent subsequent to Aug. 26, 1986, has been disclaimed.

Int. Cl.² C07F 7/22

U.S. Cl. 260—429.7 6 Claims

1. Tin salts of polyphosphonic acids having a formula selected from the group consisting of

(a)



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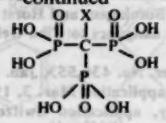
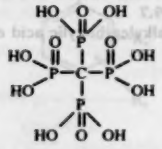
(b)



and

(c)



where X is selected from the group consisting of hydrogen, alkyl, alkenyl, aryl, chloroalkyl, chloroaryl and halogen of atomic weight 35 to 80, Y is selected from the group consisting of hydroxyl, phenyl and halogen of atomic weight 35 to 80 and Z is selected from the group consisting of hydrogen, phenyl and halogen of atomic weight 35 to 80.

4,020,092
COMPOUNDS BIS(TRIBUTYLTIN)CHROMATE AND BIS(TRIPHENYLTIN)CHROMATE

Thomas J. Pullukat, Des Plaines, Ill., assignor to Chemplex Company, Rolling Meadows, Ill.

Division of Ser. No. 414,177, Nov. 8, 1973, Pat. No. 3,876,554. This application Nov. 27, 1974, Ser. No. 527,602

Int. Cl.² C07F 7/22

U.S. Cl. 260—429.7 3 Claims

3. The new compounds of the class consisting of bis(tributyltin) and bis(triphenyltin) chromates.

4,020,093
METHOD FOR SYNTHESIZING THIOCARBAMIC ACID ESTERS

Paolo Koch, S. Giuliano Milanese (Milan), and Bartolomeo Anfossi, Milan, both of Italy, assignors to ANIC S.p.A., Palermo, Italy

Filed Apr. 20, 1976, Ser. No. 678,669

Claims priority, application Italy, Apr. 23, 1975, 22617/75

Int. Cl.² C07C 155/02

U.S. Cl. 260—455 A 10 Claims

1. A method for the preparation of esters of thiocarbamic acids comprising the step of reacting carbon monoxide and organic disulphides having the formula R′—S—S—R wherein R and R′, equal to or different from each other, represent hydrocarbon radicals, either unsubstituted or substituted, with compounds having the formula:

$$X-(A)_n-NH_2$$

wherein A is an arylene radical, either unsubstituted or substituted with halogens, hydrocarbon radicals, alkoxy groups, or it can be an alkylene radical having from 1 to 15 carbon atoms, either straight or branched, unsubstituted or substituted, in which *n* can be 0 or 1, whereas X can be hydrogen, $-NH_2$, or it can be the group H_2N-Z-, in which the bivalent function Z derives from alkyl, aryl, cycloalkyl, alkaryl, aralkyl radicals, in their turn unsubstituted or substituted.

4,020,094

2-SUBSTITUTED-5-OXO-5H-DIBENZO[a,d]CYCLOHEPTENES, THE SALTS AND ESTERS THEREOF, HAVING PHARMACEUTICAL ACTIVITY

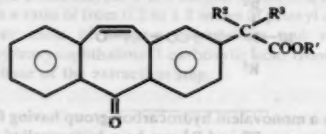
Peter H. Nelson, and Karl G. Untch, both of Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 463,211, April 22, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,517

Int. Cl.² C07C *65/20, 69/95*

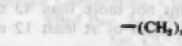
U.S. Cl. 260—469 26 Claims

1. A compound selected from the group of compounds represented by the formula:



(I)

where R′ is hydrogen, alkyl having 1 to 12 carbon atoms, or



n is an integer from 2 through 4, inclusive; R^4 and R^5 are independently lower alkyl having 1 to 6 carbon atoms; one of R^2 and R^3 is hydrogen and the other is hydrogen, methyl, or ethyl, or together R^2 and R^3 are methylene; and the pharmaceutically acceptable salts thereof.

26. A compound selected from the group consisting of 2′-carboxyphenyl 2-(5-oxo-5H-dibenzo[a,d]cyclohepten-2-yl)propionate, 2′-carbomethoxyphenyl 2-(5-oxo-5H-dibenzo[a,d]cyclohepten-2-yl)propionate, and phenyl 2-(5-oxo-5H-dibenzo[a,d]cyclohepten-2-yl)propionate.

4,020,095

BIS-THIOUREIDO-BENZENES, PREPARATION AND USES THEREOF

Teruhisa Noguchi, Tokyo; Keisuke Kohmoto, Tottori, and Kimpei Kato, Ohiso, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 771,269, Oct. 28, 1968, abandoned. This application July 8, 1976, Ser. No. 703,610

Int. Cl.² C07C *149/40*

U.S. Cl. 260—470 21 Claims

1. A compound selected from the group consisting of
1,2 - bis [(3-methoxycarbonyl) thioureido] benzene
1,2 - bis [(3-ethoxycarbonyl) thioureido] benzene
1,2 - bis [(3-isopropoxycarbonyl) thioureido] benzene
1,2 - bis [(3-isobutoxycarbonyl) thioureido] benzene
3,4 - bis [(3-ethoxycarbonyl) thioureido] toluene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-4-chlorobenzene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-4-nitrobenzene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-4,5-dichlorobenzene
1,2 - bis [(3-ethoxycarbonyl) thioureido]-3,4,6-trichlorobenzene
1,2 - bis [(3-benzyloxycarbonyl) thioureido] benzene
1,2 - bis [(3-betamethoxyethoxycarbonyl) thioureido] benzene
1,2 - bis [3-(2-chloroethoxycarbonyl) thioureido] benzene
1,2 - bis [(3-allyloxycarbonyl) thioureido] benzene
1,2 - bis [3-(2-propynyloxycarbonyl) thioureido] benzene
1,2 - bis [3-(4-chlorophenoxycarbonyl) thioureido] benzene
1,2 - bis [3-(4-methylphenoxycarbonyl) thioureido]-4-chlorobenzene
1,2 - bis [3-(4-chlorophenoxycarbonyl) thioureido]-4-methylbenzene
1,2 - bis [3-(2-naphthoxycarbonyl) thioureido] benzene
1,2 - bis [3-(2-naphthoxycarbonyl) thioureido]-4-nitrobenzene
1 - (3-ethoxycarbonyl-2-thioureido)-2-(3-methoxycarbonyl-2-thioureido) benzene

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4,020,096

10,11,DIHYDRO-N-ALKOXYCARBONYL-10,10,11,11-TETRAFLUORO-5H-DIBENZO[a,d]CYCLOHEPTENE-5-METHYLAMINES

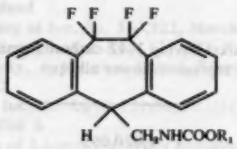
Marcia Elizabeth Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 438,924, Feb. 1, 1974, Pat. No. 3,950,423. This application Apr. 17, 1975, Ser. No. 569,134

Int. Cl.² C07C *125/06*

U.S. Cl. 260—471 C 2 Claims

1. A compound of the formula



wherein R_1 is a loweralkyl substituent, or a derivative thereof wherein one or two of the hydrogens at the 1-, 2-, 3-, 4-, 6-, 7-, 8-, or 9- positions is replaced with a substituent selected from halogen, loweralkyl, loweralkoxy, trifluoromethyl, lower alkylmercapto, loweralkylsulfonyl and dialkylsulfamoyl of from 2–8 carbon atoms.

4,020,097

BICYCLO [3.1.0]HEXANE-3-ONE DERIVATIVES OF 11-DEOXY PGE

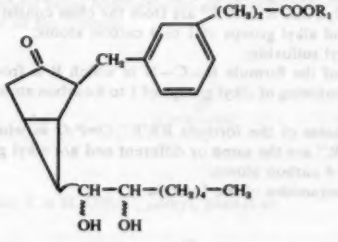
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 604,158, Aug. 13, 1975, abandoned. This application May 7, 1976, Ser. No. 684,150

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 A 5 Claims

1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, and wherein ~ indicates attachment of the side chain to the cyclopropane ring in endo or exo configuration and attachment to the side chain in alpha or beta configuration.

4,020,098

PROCESS FOR THE PREPARATION OF 5-SUBSTITUTED RESORCINOLS AND RELATED INTERMEDIATES

Jacques Gosteli, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

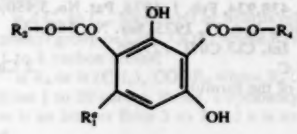
Division of Ser. No. 419,579, Nov. 28, 1973, abandoned. This application July 9, 1975, Ser. No. 594,412

Claims priority, application Switzerland, Dec. 7, 1972, 17825/72

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 S 9 Claims

1. A compound of the formula IVa



(IVa)

wherein

R_1[a] represents alkyl having 3–12 carbon atoms or phenyl, and R_2 and R_4 each represents lower alkyl.

4,020,099

PURIFICATION OF DIPHENYL TEREPHTHALATE

Vincent P. Kuceski, Chicago, Ill., assignor to The C. P. Hall Company, Stow, Ohio

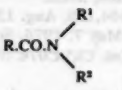
Continuation-in-part of Ser. No. 269,120, Oct. 10, 1972, abandoned. This application Jan. 27, 1975, Ser. No. 544,259

Int. Cl.² C07C *69/80, 69/82*

U.S. Cl. 260—475 PN 3 Claims

1. The method of purifying a diphenyl phthalate which comprises crystallizing it from a solution which contains a dipolar-aprotic solvent and a hydrocarbon solvent wherein the ratio of the hydrocarbon solvent to the dipolar-aprotic solvent is 1:1 to 20:1, the dipolar-aprotic solvent being selected from the class consisting of

a. amides of the formula



in which R is

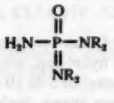
hydrogen, an alkyl group of 1 to 10 carbon atoms, phenyl, tolyl and xylyl; and R^1 and R^2 are from the class consisting of hydrogen and alkyl groups of 1 to 4 carbon atoms;

b. dimethyl sulfoxide;

c. nitrile of the formula R—C—N in which R is from the class consisting of alkyl groups of 1 to 6 carbon atoms and phenyl;

d. phosphates of the formula RR′R″-O=P-O in which R, R′and R″ are the same or different and are alkyl groups of 1 to 4 carbon atoms;

e. phosphoramides of the formula



in which the R's are methyl or ethyl;

f. N,N′-dialkyl carboxylic acid esters of the formula R'_2. NOC-$(CH_2)_2$ to $_4$-COOR in which the alkyl groups are the same or different and contain 1 to 4 carbon atoms; and

g. nitrobenzene.

4,020,100

HYDROXAMIC BETAINES

William Price Evans, Wirral, and Appayya Raghunath Naik, Birkenhead, both of England, assignors to Lever Brothers Company, New York, N.Y.

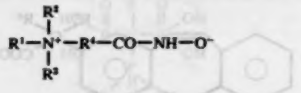
Continuation of Ser. No. 396,933, Sept. 13, 1973, abandoned. This application Dec. 3, 1975, Ser. No. 637,249

Claims priority, application United Kingdom, Sept. 19, 1972, 43274/72

Int. Cl.² C07C *103/70, 101/04*

U.S. Cl. 260—501.13 5 Claims

1. A hydroxamic betaine of the general formula



in which R^1 is a monovalent hydrocarbon group having from 1 to 25 carbon atoms, R^2 and R^3 can be a hydroxyalkyl group having from 1 to 4 carbon atoms, or a monovalent hydrocarbon group having from 1 to 25 carbon atoms, R^4 is a bivalent, methylene, ethylene, propylene or butylene group, with the proviso that the betaine contains not more than 45 carbon atoms and at least one carbon chain of at least 12 carbon atoms.

4,020,101

α-ALKYL-PHOSPHONOSUCCINIC ACID COMPOUNDS AND SEQUESTERING COMPOSITIONS CONTAINING THEM

Hans Geffers, Cologne; Walter Radt, Leverkusen; Reinhard Schliebs, Cologne, and Hartmut Schulz, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

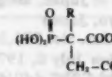
Continuation of Ser. No. 218,516, Jan. 17, 1972, abandoned. This application Jan. 20, 1975, Ser. No. 542,741

Claims priority, application Germany, Mar. 28, 1970, 2015068

Int. Cl.² C07F *9/38*

U.S. Cl. 260—502.4 R 7 Claims

1. α-Alkyl-phosphonosuccinic acid compound of the formula



in which R is lower alkyl, or lower alkenyl or lower alkynyl.

4,020,102

PRODUCTION OF 2-HYDROXYNAPHTHALENE-3-CARBOXYLIC ACID

Hans-Juergen Quadbeck-Seeger, Bad Duerkheim, and Helmut Hoch, Wachenheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

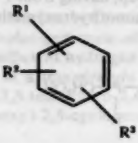
Filed Sept. 25, 1975, Ser. No. 616,684

Claims priority, application Germany, Oct. 19, 1974, 2449779

Int. Cl.² C07C *51/15, 51/48*

U.S. Cl. 260—520 A 22 Claims

1. A process for the manufacture of 2-hydroxynaphthalene-3-carboxylic acid which comprises reacting sodium β-naphtholate or a mixture of sodium β-naphtholate and 0.02 to 0.5 mol, per mol of sodium β-naphtholate, of potassium β-naphtholate with carbon dioxide at a temperature of at least 180° C and at a pressure of 2 to 50 atmospheres in the absence of an organic solvent, and extracting β-naphthol, xanthone, and resins and/or condensation products of naphthol from the reaction mixture in the presence of at least 15 moles of water per mole of starting naphtholate at a pH of from 4 to 8 and at a temperature of from 30° to 120° C with a phenyl compound of the formula (I):



(I)

in which

R^1, R^2 and R^2 are identical or different and each is a hydrogen atom, alkyl of 1 to 6 carbon atoms or a halogen atom, in a ratio of from 0.2 to 1.8 moles of phenyl compound (I) per mole of starting naphtholate and recovering 2-hydroxynaphthalene-3-carboxylic acid from the aqueous phase of the extraction step.

4,020,103

RECOVERY OF CALCIUM PANTOTHENATE

Julian Robert Trocki, Bayonne, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 24, 1975, Ser. No. 644,080

Int. Cl.² C07C *99/12*

U.S. Cl. 260—534 A **10 Claims**

1. A process for recovery of calcium pantothenate comprising:

Adding a mixture of calcium pantothenate in methanol to a still containing a solvent heated to a temperature above the methanol boiling point at an addition rate which balances heat input rate to the still so that methanol evaporates on contact with the hot solvent and calcium pantothenate precipitates as solid particles in the hot solvent.

4,020,104

PROCESS FOR ISOMERIZING CIS,CIS- AND CIS,TRANS-ISOMERS OF DI-(P-AMINOCYCLOHEXYL)METHANE TO THE CORRESPONDING TRANS,TRANS-ISOMER

Reinhard H. Richter, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

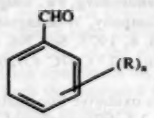
Filed Sept. 20, 1976, Ser. No. 724,585

Int. Cl.² C07C *85/18, 85/20*

U.S. Cl. 260—563 B **7 Claims**

1. A process for the isomerization of the cis-cis- and cis,-trans-isomers of di-(p-aminocyclohexyl)methane to form predominantly the corresponding trans,trans-isomer which comprises

reacting said stereoisomers of di-(p-aminocyclohexyl)methane with a benzaldehyde of the formula:



wherein *n* is an integer from 0 to 3 is an inert substituent to form the corresponding bis-benzaldimine of di-(p-aminocyclohexyl)methane;

contacting said bis-benzaldimine with a base in a polar solvent at ambient temperature to effect isomerization of the cis,cis- and cis,trans-isomers of said bis-benzaldimine to the corresponding trans,trans-isomer; and

subjecting the resulting product to acid hydrolysis to yield di-(p-aminocyclohexyl)methane enriched in trans,trans-isomer.

4,020,105

OXIME

Norman Ackerley; Peter Albert Mack, and David Harold Johnson, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 29, 1975, Ser. No. 617,393

Claims priority, application United Kingdom, Sept. 30, 1974, 42340/74

Int. Cl.² C07C *131/00, 131/14*

U.S. Cl. 260—566 A **2 Claims**

1. 5-Heptyl-2-hydroxybenzaldoximes in which the heptyl group is attached to the benzene ring through a tertiary carbon atom.

4,020,106

METAL EXTRACTION PROCESS

Norman Ackerley, and Peter Albert Mack, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 340,922, March 13, 1973, abandoned. This application Aug. 12, 1975, Ser. No. 603,968

Claims priority, application United Kingdom, Mar. 21, 1972, 13158/72

Int. Cl.² C07C *131/00, 131/14*

U.S. Cl. 260—566 A **1 Claim**

1. A mixture of 5-nonyl-2-hydroxy benzaldoximes wherein the nonyl is a mixture of branched chain isomers.

4,020,107

CATALYTIC REDUCTION OF HALONITROAROMATIC COMPOUNDS

John R. Kosak, Greenville, Del., assignor to E. I. Du Pont de Nemours and Co., Wilminton, Del.

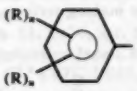
Filed Apr. 7, 1975, Ser. No. 565,945

Int. Cl.² C07C *85/11;* **C07B** *29/00*

U.S. Cl. 260—580 **12 Claims**

1. Improved process for minimizing dehalogenation during the catalytic hydrogenation of a mononitro aromatic hydrocarbon having 6 to 14 ring carbon atoms and 1 or 2 halogen atom substituents, at a temperature of 25° to 200° C and a pressure of 100 to 700 psig, the catalyst being a platinum or palladium catalyst, the amount of catalyst being such that the weight ratio of nitro compound being hydrogenated to catalyst metal is between 10,000:1 and 100,00:1, the improvement consisting essentially of carrying out the hydrogenation in the presence of 0.01 to 10 weight %, based on the weight of nitro compound being hydrogenated, of an acidic phosphorus compound of the formula

wherein X is H, OH, C_{1-12}alkyl, phenyl or



wherein each *n* is 0 or 1 and R is C_{1-9} alkyl, said amount of acidic phosphorus compound being such that the pH of the reaction mass after hydrogenation is no greater than 3.

4,020,108
SELECTIVE HYDROGENATION OF UNSATURATED COMPOUNDS

William J. Ehmann, Orange Park, Fla., assignor to SCM Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 530,750, Dec. 9, 1974, abandoned, and a continuation-in-part of Ser. No. 530,732, Dec. 9, 1974, abandoned. This application June 30, 1976, Ser. No. 701,149

Int. Cl.² C07B 1/00; C07C 45/00

U.S. Cl. 260—586 P 12 Claims

1. In a process for the selective catalytic hydrogenation of the unsaturation of unsaturated compounds wherein the hydrogenation is performed in the presence of a cobaloxime catalyst, the improvement which comprises carrying out the hydrogenation in a vehicle of a glyoxime complexing agent for cobalt wherein the molar ratio of said complexing agent to cobalt is at least about 16:1 and the molar ratio of unsaturated compound to cobalt is at least about 100:1.

4,020,109
STABILIZING ALKANALS

Raymond N. Fleck, West Covina, and Donald C. Young, Fullerton, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Dec. 26, 1972, Ser. No. 318,176

Int. Cl.² C07C 47/02

U.S. Cl. 260—601 R 6 Claims

1. The method of inhibiting the aldol condensation of an alkanal having from 2 to about 25 carbons and at least one hydrogen on the alpha carbon, in the absence of solvent or in the presence of an organic solvent inert to the inhibitor hereinafter defined, which comprises admixing therewith an inhibitor selected from the group consisting of:

a. finely divided elemental metals having particle sizes sufficiently small to pass a 100 mesh screen and selected from cadmium, indium, thallium, cobalt, nickel, molybdenum, tin, lead, copper and combinations thereof;

b. the finely divided oxides of multivalent metal cations selected from chromous, titanous, vanadous, stannous, cuprous cations and combinations thereof; and

c. salts of oxidizable multivalent metal cations selected from chromous, titanous, vanadous, stannous and cuprous cations, and anions selected from nitrate, sulfate, halide, C_1–C_{12} carboxylate and alkyl and aryl sulfonate anions and combinations thereof;

said metals and cations having standard oxidation potentials between −0.20 and +0.41 volts, in an amount from 0.005 to 1.0 weight percent expressed as the metal and based on said alkanal.

4,020,110
PRODUCTION OF TERTIARY METHYLPHOSPHINE OXIDES

Bernd Lippsmeier, Huth-Knapsack; Klaus Hestermann, Erftstadt Bliesheim, and Martin Reuter, Frankfurt am Main-Unterliederbach, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 20, 1975, Ser. No. 560,294

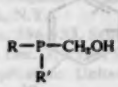
Claims priority, application Germany, Mar. 22, 1974, 2413823

Int. Cl.² C07F 9/53

U.S. Cl. 260—606.5 P 4 Claims

1. In the process for making tertiary methylphosphine oxides of the formula

in which R and R′ are identical or different alkyl groups other than a hydroxymethyl group, having from 1 to 6 carbon atoms by rearranging tertiary mono(hydroxymethyl)-phosphines of the formula



in which R and R′ have the meanings given above, in the presence of a catalyst and in the absence of oxygen, water and alcohol at temperatures within the range minus 10° C and plus 250° C, the improvement which comprises using BF_3.etherate as catalyst.

4,020,111
PROPYNYLOXY ALKYL ARENE INSECTICIDES

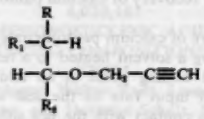
Douglas J. Hennessy, 47 Grayson Place, Teaneck, N.J. 07666

Division of Ser. No. 397,127, Sept. 13, 1973, abandoned, which is a division of Ser. No. 164,411, July 20, 1971, abandoned. This application May 28, 1975, Ser. No. 581,536

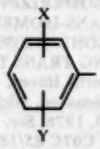
Int. Cl.² C07C 41/00

U.S. Cl. 260—611 A 7 Claims

1. A propynyloxy alkyl arene compound represented by the formula



wherein R represents hydrogen or alkyl of not more than three carbon atoms, R_1 represents nitro, and R_2 represents an aromatic hydrocarbon selected from the class consisting of naphthyl and groups having the structural formula



wherein X and Y represent hydrogen, nitro or halogen other than iodine.

4,020,112
OXIDATIVE FLUORINATION OF PHENOLS

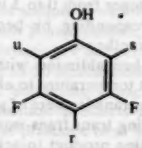
George Albert Boswell, Jr., Wilmington, Del., and Charles William Tullock, Landenberg, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 6, 1975, Ser. No. 547,495

Int. Cl.² C07C 43/20

U.S. Cl. 260—612 R 2 Claims

1. A method for the oxidative fluorination of phenols which comprises reacting a 3,5-difluorophenol of the formula

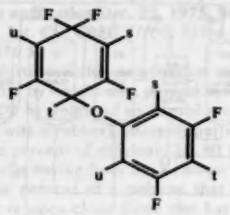


where

s and *u*, alike or different, are chlorine, bromine or fluorine, and

r is hydrogen, chlorine, or fluorine

with 0.1 to 10 moles per mole of starting phenol of sulfur tetrafluoride in sufficient hydrogen fluoride to keep the reactants in solution at a temperature of 0° to 100° C, thereby forming 1,1,3,5-tetrafluoro-2,4,6-trihalo-4-(3,5-difluoro-2,4,6-trihalophenoxy)-2,5-cyclohexadiene of the structure



where

s and *u* are as specified above, and

t is chlorine, or fluorine, provided that

when *r* is hydrogen or fluorine, *t is fluorine, and,*

when *r* is chlorine, *t* is chlorine.

4,020,113

4,4'-METHYLENEBIS(2,6-DIISOBUTYLPHENOL)

Gordon D. Brindell, Crystal Lake, and Rudy F. Macander, Cary, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Jan. 15, 1972, Ser. No. 253,341

Int. Cl.² C07C *39/16*

U.S. Cl. 260—619 A **1 Claim**

1. 4,4'-methylenebis(2,6-diisobutylphenol).

4,020,114

PROCESS FOR SEPARATING BUTADIENE FROM C_4 HYDROCARBONS STREAMS OBTAINED BY STREAM-CRACKING

Carlo Rescalli, and Alessandro Ginnasi, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., San Donato, Milanese, Italy

Filed May 21, 1975, Ser. No. 579,714

Claims priority, application Italy, May 21, 1974, 23008/74

Int. Cl.² C07C *7/00*

U.S. Cl. 260—681.5 R **12 Claims**

1. A process for separating butadiene from C_4 hydrocarbon streams obtained by steam cracking containing, besides butadiene, C_4 linear saturated and olefinic hydrocarbons, isobutylene and acetylenic compounds characterized in that isobutylene is etherified in a first reactor with methanol or another alcohol in presence of an acid ion exchange resin, the acetylenic compounds are etherified with methanol or another alcohol in a second reactor in presence of the same or of different acid ion exchange resin containing mercuric ions in amount also lower than that of the acid ions and thereafter subjecting to distillation operations the ether containing mixture for separating both the saturated and olefinic hydrocarbons and said ethers from butadiene.

4,020,115

ALKALINE BARIUM ALCOHOLATES

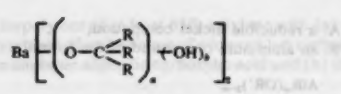
Ivan Glen Hargis, Tallmadge; Russell Anthony Livigni, and Sundar Lal Aggarwal, both of Akron, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 593,579, July 7, 1975, Pat. No. 3,992,561. This application Apr. 23, 1976, Ser. No. 679,542

Int. Cl.² C07C *29/00, 31/30, 35/21*

U.S. Cl. 260—632 A **10 Claims**

1. A compound having the formula



where at least one R is a methyl or cyclohexyl radical and where the remaining Rs are selected from the group consisting of alkyl and cycloalkyl radicals having from 1 to 6 carbon atoms which may be the same or different, and where the mol ratio of *a* to *b* is from about 99.5:0.5 to 88:12.

4,020,116

VAPOR PHASE CATALYTIC PROCESS FOR PREPARING ALPHA, BETA-ETHYLENICALLY UNSATURATED ALCOHOLS

Thomas H. Vanderspurt, Gillette, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed May 12, 1976, Ser. No. 685,610

Int. Cl.² C07C *29/14*

U.S. Cl. 260—638 B **14 Claims**

1. A selective vapor phase process for preparing alpha, beta-ethylenically unsaturated alcohols which comprises reacting at least one alpha, beta-ethylenically unsaturated aldehyde with a hydrogen-containing gas in the vapor phase in the presence of a supported rhenium catalyst comprising (I) at least one rhenium compound having a formal oxidation number on the rhenium atom of three or less, and (2) at least one support for said rhenium compound, said support having an average pore diameter greater than about 40 A

4,020,117

ADSORPTIVE RECOVERY SYSTEM FOR METHYL CHLORIDE AND METHYLENE CHLORIDE

Richard M. Sisson, Washougal, Wash., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 517,694, Oct. 24, 1974, abandoned, which is a continuation of Ser. No. 317,891, Dec. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 68,266, Aug. 21, 1970, abandoned. This application Aug. 14, 1975, Ser. No. 603,842

Int. Cl.² C07C *17/38*

U.S. Cl. 260—652 P **12 Claims**

1. A process for the recovery of methyl chloride and methylene chloride from a methane chlorination reactor effluent containing significant amounts of relatively noncondensable gases comprising cooling the reactor effluent to a temperature of from about −50° C. to about 20° C., passing the cooled reactor effluent to an adsorption stage containing a solid adsorbent material selected from the group consisting of silica gels, activated carbon, activated alumina, molecular sieves and combinations thereof to adsorb the methyl chloride and methylene chloride, stripping the methyl chloride and methylene chloride from the adsoprtion stage at a temperature of from about 100° C. to about 400° C. by the use of methane feed for the chlorination reactor, and subsequently cooling the adsorption stage.

4,020,118

PROCESS FOR PRODUCING ISOPRENE TRIMERS

Hiroyuki Morikawa; Takahiro Sato, and Isao Okada, all of Ibaraki, Japan, assignors to Mitsubishi Petrochemical Company Limited, Japan

Filed Feb. 11, 1976, Ser. No. 657,308

Claims priority, application Japan, Feb. 17, 1975, 50-19591

Int. Cl.² C07C *3/035, 13/27*

U.S. Cl. 260—666 B **14 Claims**

1. In a process for producing a cyclic trimer of isoprene by oligomerization of isoprene over a catalyst, the improvement which comprises contacting isoprene a catalyst consisting essentially of:

A. a reducible nickel compound;
B. an aluminum compound of the formula:

$$AlR_m(OR')_{3-m}$$

wherein R and R' respectively represent an alkyl group having from 1 to 10 carbon atoms or an aryl group, and m is an integer of 0 to 3;
C. a reaction product of triethyl phosphite and pentaerythritol; and
D. a monohydric alcohol having from 2 to 6 carbon atoms.

4,020,119

SELECTIVE HYDROGENATION PROCESS

Marvin M. Johnson; Donald C. Tabler, and Gerhard P. Nowack, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 390,799, Aug. 23, 1973, Pat. No. 3,900,526, which is a division of Ser. No. 249,726, May 2, 1972, Pat. No. 3,787,511, which is a division of Ser. No. 44,665, June 8, 1970, Pat. No. 3,697,448, which is a continuation-in-part of Ser. No. 6,971, Jan. 29, 1970, abandoned. This application May 5, 1975, Ser. No. 574,824
Int. Cl.² C07C *11/02*
U.S. Cl. 260—677 A **13 Claims**

1. A process for hydrotreating an acyclic monoolefin feedstream containing undesirable materials including acetylenic compounds, organic sulfur compounds, carbonyl compounds, diolefins, and other unsaturated impurities to selectively hydrogenate said undesirable materials which comprises contacting hydrogen and said feedstream under hydrogenation conditions with a catalyst consisting essentially of an arsenide having empirical formula MAs_x, M being iron, or cobalt and x being a number from about 0.6 to about 1.0 at an elevated temperature sufficient to selectively hydrogenate and remove a substantial portion of said undesirable materials present in said feedstream without significant conversion of acyclic monoolefin to saturates and recovering said acyclic monoolefin feedstream substantially reduced in said undesirable materials.

4,020,120

MODIFIED ZINC FERRITE OXIDATIVE DEHYDROGENATION CATALYSTS

Harold F. Christmann, Seabrook, and Edward J. Miklas, Conroe, both of Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Division of Ser. No. 502,382, Sept. 3, 1974, Pat. No. 3,998,760. This application Dec. 8, 1975, Ser. No. 638,742
Int. Cl.² C07C *11/12*
U.S. Cl. 260—680 D **8 Claims**

1. The process of oxidative dehydrogenation of organic compounds having from about 2 to about 20 carbon atoms and at least one

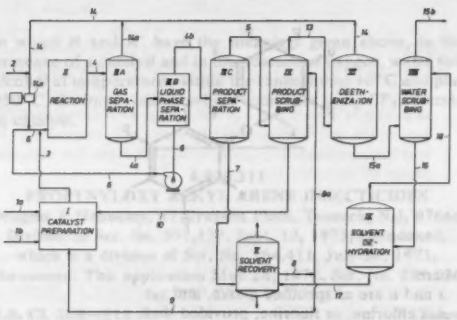
group at temperature of from about 500° to about 1,200° F. and in the presence of from about 0.2 to about 2.0 mols of oxygen per mol organic compound to thereby produce a dehydrogenated compound having the same number of carbon atoms in the presence of a catalyst composition consisting essentially of zinc ferrite having the empirical formula $Zn_xFe_yO_z$ wherein x is from 0.1 to about 2, y is about 0.3 to about 12, and z is about 3 to about 18 and a promoter of magnesium oxide in an amount of from about 0.1 to about 10 wt.% and manganese oxide in an amount of about 0.1 to about 10 wt.% based on the weight of the zinc ferrite composition.

4,020,121

OLIGOMERIZATION REACTION SYSTEM

Albert T. Kister, and Eugene F. Lutz, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 15, 1975, Ser. No. 640,597
Int. Cl.² C07C *3/10*
U.S. Cl. 260—683.15 D **7 Claims**



1. In the process for the oligomerization of ethylene to linear alpha-olefins wherein (1) ethylene is oligomerized by contact in liquid phase at elevated pressure with a solution of an oligomerization catalyst composition comprising catalytically active nickel complex in a polar organic solvent; (2) at least part of the resulting reaction product is separated at elevated pressure into a liquid solvent phase and a liquid hydrocarbon product phase containing dissolved ethylene, catalyst and solvent; and (3) said product phase is separated into unreacted ethylene and ethylene oligomers, the improvement which comprises scrubbing said hydrocarbon product phase, after separation from the solvent phase and while at sufficiently elevated pressure to maintain said ethylene dissolved therein, with sufficient polar organic solvent to remove the residual amount of catalytically active nickel complex from said product phase.

4,020,122

PROCESS FOR THE PREPARATION OF POLYESTER COMPOSITIONS HAVING INCREASED MELT ELASTICITY

Willem F. H. Borman, Pittsfield, and John A. Rock, Dalton, both of Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Jan. 5, 1973, Ser. No. 321,266
Int. Cl.² C08L *63/00*
U.S. Cl. 260—835 **8 Claims**

1. A process for increasing the melt elasticity of a high molecular weight linear polyester resin consisting essentially of poly(1,4-butylene terephthalate), said process comprising adding to said high molecular weight resin an organic compound containing at least two epoxide groups to form a mixture of said compound and said resin, the amount of said compound comprising from about 0.1 to about 5% by weight based on the total weight of the mixture, and heating the mixture until the desired increase in melt elasticity is attained.

4,020,123

POLYAMINE COATING COMPOSITIONS

Louis E. Trapasso, Watchung, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,580
Int. Cl.² C08G *39/10, 45/14*
U.S. Cl. 260—837 R **11 Claims**

1. A coating composition curable at ambient temperatures comprising a mixture of thermoplastic resin containing a plurality of groups selected from primary and secondary amino groups, and an organic polyester derivative which contains between 2 and about 5 isopropenyl ester groups.

4,020,124

BLENDS OF A POLYPHENYLENE ETHER RESIN, ALKENYL AROMATIC RESINS MODIFIED WITH EPDM RUBBER AND GRAFT POLYMERIZED HIGH RUBBER CONTENT POLYMERS

Visvaldis Abolins; Glenn D. Cooper, both of, Delmar, and Gim F. Lee, Jr., Albany, all of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 443,150, Feb. 15, 1974, Pat. No. 3,981,841. This application Dec. 22, 1975, Ser. No. 642,982

Int. Cl.² C08L *51/04, 31/04*

U.S. Cl. 260—876 R 4 Claims

1. A thermoplastic molding composition which comprises:

a. from 20–65% by weight of a polyphenylene ether resin;

b. from 25–70% by weight of an alkenyl aromatic resin that is modified with a rubbery interpolymer which comprises 10–90 mole percent of ethylene, 10–90 mole percent of an alpha olefin having from 3–10 carbon atoms and from 0.1–10 mole percent of a polyene that is a non-conjugated cyclc or open-chain diene that has from 5–10 carbon atoms; and

c. from 5–20% by weight of a graft copolymer comprising (1) from 20–80% by weight of a back-bone polymer of the units of butadiene or butadiene and styrene, wherein the butadiene units are present in quantities of at least 40% by weight of the backbone polymer, (2) 80–20% by weight of an acrylic monomer graft polymerized to (1) the acrylic monomer units chosen from the group consisting of lower alkyl methacrylates, alicyclic methacrylates and alkyl acrylates, and (3) 0 to 60% by weight of a styrene monomer graft polymerized to (1) sequentially before the polymerization of (2).

4,020,125

THERMOSETTING RESIN

Hisao Suzuki, Fujisawa; Akira Musashi; Yoshiyuki Ando, and Tomoyuki Inoue, all of Ichihara, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Filed Sept. 12, 1972, Ser. No. 288,374

Claims priority, application Japan, Sept. 14, 1971, 46-70890

Int. Cl.² C08L *75/00*

U.S. Cl. 260—859 R 4 Claims

1. A resin consisting essentially of a reaction product between (1) hydrogenated polybutadienediol which is prepared by hydrogentating polybutadienediol having an average molecular weight of 500 to 20,000 and 85 to 100% of 1,2-configuration, said polybutadienediol having been hydrogenated to the extent that at least 30% of the double bonds contained therein are hydrogenated and (2) an isocyanate compound obtained by the reaction of an organic diisocyanate and a hydroxyalkyl acrylate or an hydroxyalkyl methacrylate, wherein the ratio of isocyanate groups in the diisocyanate to the hydroxyalkyl acrylate or hydroxyalkyl methacrylate is from 1.1:1 to 2.5:1 and the ratio of isocyanate groups in the isocyanate compound to hydroxy groups in the polybutadienediol is from 0.5:1 to 1.2:1.

4,020,126

POLYETHYLENE TEREPHTHALATE/TERPOLYMER BLENDS; FILMS, SHEETS, AND ARTICLES MADE USING SUCH BLENDS; AND METHOD OF MAKING TRAYS USING SUCH SHEETS

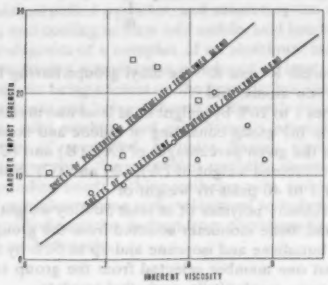
Frederick W. Gander, Kennett Square, Pa.; Erhard F. Hoegger, Wilmington, Del., and William P. Kane, Bon Air, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 488,826, Aug. 2, 1974, abandoned. This application June 27, 1975, Ser. No. 591,096

Int. Cl.² C08G *39/10*

U.S. Cl. 260—873 19 Claims

1. A thermoformable sheet made from a blend including: 99 to 95% polyethylene terephthalate and 1 to 5% of a terpolymer of at least 65% ethylene with (a) at least 5% by weight of a vinyl ester of a lower (1–6 carbon) saturated monobasic aliphatic carboxylic acid and (b) 0.5



to 10% by weight of an acid of the group consisting of acrylic and methacrylic acids, said terpolymer having been made by a free-radical initiated polymerization of a mixture of ethylene, said ester and said acid.

4,020,127

BIGRAFT COPOLYMERS AND PROCESS FOR THE PREPARATION THEREOF

Joseph P. Kennedy, Copley, Ohio, and Alain Vidal, Mulhouse, France, assignors to The University of Akron, Akron, Ohio

Filed Sept. 9, 1975, Ser. No. 611,634

Int. Cl.² C08F *255/06, 257/02, 255/02, 259/04*

U.S. Cl. 260—878 R 25 Claims

1. A bigraft copolymer product comprising:

a polymer backbone selected from the class consisting of saturated and unsaturated hydrocarbon homopolymers, copolymers and terpolymers, such polymers having halogen functionality and

a plurality of at least two different graft polymer branches wherein said polymer branches are formed from monomers selected from the group consisting of monovinyl aromatic compounds having from about 8 to 20 carbon atoms per molecule and isoolefins having from 4 to about 8 carbon atoms per molecule.

4,020,128

POLYMERIZATES OF OLEFINIC NITRILES AND DIENE RUBBERS

Walid Y. Aziz, Warrensville; Lawrence E. Ball, Cuyahoga Falls, and George S. Li, Aurora, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Filed Feb. 13, 1976, Ser. No. 657,867

Int. Cl.² C08F *279/02*

U.S. Cl. 260—879 10 Claims

1. The polymeric composition resulting from the polymerization of 100 parts by weight of

A. from about 60 to 90% by weight of at least one nitrile having the structure

$$CH_2=\underset{\displaystyle R}{\overset{\displaystyle |}{C}}-CN$$

wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen,

B. from 10 to 30% by weight of an alpha-olefin having the structure

wherein R' and R'' are alkyl groups having from 1 to 7 carbon atoms, and

C. from 1 to 20% by weight of at least one member selected from the group consisting of indene and coumarone

wherein the given percentages of (A), (B) and (C) are based on the combined weight of (A), (B) and (C) in the presence of from 1 to 40 parts by weight of

D. a rubbery polymer of at least 50% by weight of a conjugated diene monomer selected from the group consisting of butadiene and isoprene and up to 50% by weight of at least one member selected from the group consisting of styrene, acrylonitrile, and ethyl acrylate.

4,020,129

PRODUCTION OF DITHIOPHOSPHORIC ACID-O,O-DIESTERS

Hilmar Roszinski; Bernd Lippsmeier, both of Hurth-Knapsack, and Gerhard Hartlapp, Hurth-Hermulheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

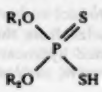
Filed Apr. 29, 1975, Ser. No. 572,838

Claims priority, application Germany, May 3, 1974, 2421462

Int. Cl.² C07F 9/17, 9/173, 9/18, 9/177

U.S. Cl. 260—983 **8 Claims**

1. A process for making pure dithiophosphoric acid-O,O-diesters of the general formula



(I)

in which the radicals R_1 and R_2, being identical or different, each stand for linear and/or branched alkyl, cycloalkyl, alkenyl, alkinyl, aralkyl or aryl radicals having up to 18 carbon atoms, from their salts of the general formula

(II)

in which R_1 and R_2, respectively, have the meanings given hereinabove, M stands for a metal or ammonium cation, and *n* stands for the valency of the particular cation, which comprises mixing at temperatures within the range −5° and plus 60° C the salts with strong mineral acids having a strength within the range 30 and 90 weight % in the quantity necessary to ensure dissolution of the salts and formation of two separate liquid phases, and separating the two phases from one another.

4,020,130

SPLASH BAR FOR COOLING TOWER FILL ASSEMBLY

John C. Ovard, 3465 Ridgeview Drive, Santa Rosa, Calif. 95405

Filed Aug. 21, 1975, Ser. No. 606,031

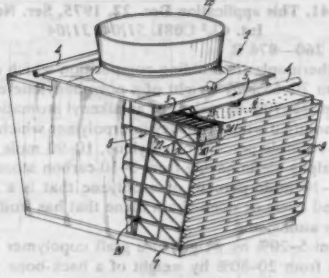
Int. Cl.² F28C 1/00

U.S. Cl. 261—111 **7 Claims**

1. For use with a crossflow water cooling tower having a hot water distributor for distributing water onto the splash type fill assembly structure, a cold water basin and means for inducing crossflow movement of air therebetween, a combination therewith of splash type fill assembly structure comprising,

a series of elongated generally horizontal fill members;

means supporting the fill members in the space between the hot water distributor and said cold water basin in horizontal and vertical spaced relationship;



said fill members having their longitudinal axis generally parallel with the direction of air flow and said fill members having a substantially flat elongated upper surface element, a substantially flat elongated lower surface element and a connecting elongated substantially vertical surface element, said upper and lower surface elements being substantially parallel to each other and all of said surface elements being perforated throughout for passage and dispersal of liquid falling thereon.

4,020,131

PREPARATION OF MIXED OXIDE NUCLEAR FUEL

Melville A. Feraday, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Dec. 1, 1975, Ser. No. 636,678

Claims priority, application Canada, Feb. 28, 1975, 221017

Int. Cl.² G21C 21/00

U.S. Cl. 264—.5 **4 Claims**

1. A method of making enriched mixed oxide nuclear fuel comprising:

a. sintering green oxide fuel pellets of a first nuclear fuel material in a first stage of sintering until the pellets have a 3–25% open porosity, said sintering being carried out at a temperature in the range 1100° to 1400° C,

b. grinding off the outer surface layer of the pellets,

c. impregnating the pellets with a salt of a second nuclear fuel material in solution, and

d. subjecting the impregnated pellets to a second stage of sintering in the temperature range 1500° to 1700° C to convert the salt of the second nuclear material to oxide of the material.

4,020,132

CONSTRUCTION JOINT FOR REINFORCED CONCRETE STRUCTURES

Anthony J. Calini, Rte. No. 1, Guilford, Conn. 06437

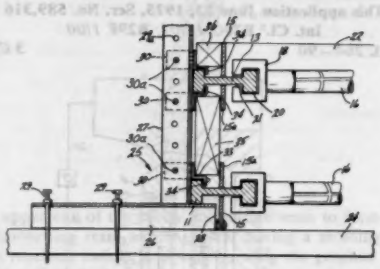
Continuation of Ser. No. 171,090, Aug. 12, 1971, abandoned. This application Nov. 26, 1975, Ser. No. 635,291

Int. Cl.² E04G 21/00

U.S. Cl. 264—34 **5 Claims**

1. A method of connecting a first concrete section to a later poured section on site comprising the steps of providing a form for the first section with a dam at an edge of the first section and providing an elongated rigid coupling member extending along the length of said dam and having integral side edges extending laterally therefrom through said dam and essentially parallel to said member, providing reinforcing bars having coupling means on the ends thereof, said coupling means and said side edges having cooperating interlocking

means permitting said coupling means to be joined to said side edges and moved longitudinally for positioning thereon but preventing withdrawal of said coupling means from said side edge, mechanically interlocking said coupling means of said reinforcing bars to said coupling member along the side edge thereof within the formed section with the reinforcing bars



extending substantially perpendicular to said elongated member, and positioning said bars along the length of said coupling member, pouring the first section, removing the dam, mechanically interlocking reinforcing bars to said coupling member along the other side edge thereof and positioning said bars along the length of said coupling member, and pouring the second section.

4,020,133

ANTI-LUMPING COATING FOR POLYSTYRENE BEADS

Timothy Altares, Jr., Valencia, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Aug. 2, 1976, Ser. No. 710,939
Int. Cl.² B29D *27/00*
U.S. Cl. 264—53 **2 Claims**

1. In a method for the preparation of expandable polystyrene beads, the combination of steps which includes:

preparing an aqueous system containing from about 0.02 to about 1% collagen having an average molecular weight of at least 60,000;

preparing the complex resulting from the interaction of an introduced aluminum ion of a water soluble aluminum salt with said collagen in said aqueous system, the weight concentration of the aluminum ion introduced being from about 20% to about 200% of the weight concentration of the collagen;

agitating and dispersing said complex in said aqueous system;

suspending approximately spherical beads of a polymer which is predominantly polystyrene in said agitated dispersion, relying upon said complex as the major suspending agent, the aqueous suspension of the beads being in an impregnation vessel;

introducing blowing agent into said impregnation vessel containing said aqueous suspension of beads and controlling the sequence of pressure and temperture to impregnate blowing agent into said beads and to cool the impregnated beads, the said blowing agent being selected from the inert organic materials consisting of C_3–C_7 hydrocarbons, halogenated hydrocarbons having a volatility within the volatility range of said C_3–C_7 hydrocarbons ethers having a volatility range of said C_3–C_7 hydrocarbons, and mixtures thereof, said impregnation introducing from about 3% to about 7% blowing agent into said beads;

draining aqueous material from the impregnated beads and removing said impregnated beads from said impregnating vessel and washing the beads, a measurable amount of said complex of collagen and aluminum salt being a wash-resistant deposit on the exterior of the bead;

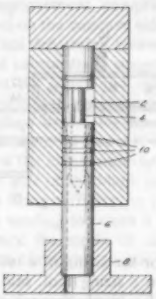
and withdrawing said washed beads as the product of the method, said beads being suitable for the molding of an article having a predominant volume of cellular polystyrene by steps comprising pre-expanding beads at a temperature in the temperature range embraced by low pressure steam to prepare pre-puffed particles, filling a mold with said prepuffed particles, and subjecting the mold to heating and cooling to form said article, said beads having surface deposits of a complex of an aluminum salt and a collagen having a molecular weight of at least 60,000, said deposits being present on the bead surface in measurable amounts and being adhered sufficiently tenaciously to resist mild washing and said deposits promoting the formation of prepuffed particles having significantly fewer lumps than the prepuffed particles derived from corresponding beads lacking such deposits, and said prepuffed particles passing static electrical tests better than the prepuffed particles derived from corresponding beads lacking such deposits.

4,020,134

METHOD FOR PREPARING SHAPED, GREEN CERAMIC COMPACTS

Ronald S. Gordon, Salt Lake City; Ralph W. Sutton, Tooele, both of Utah, and Gerald J. Tennenhouse, Oak Park, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 29, 1975, Ser. No. 545,046
Int. Cl.² C04B *35/64*
U.S. Cl. 264—63 **19 Claims**



14. A method for preparing shaped, green ceramic compacts suitable for firing to form high density β''-alumina containing ceramic bodies having a density of between about 45 and about 60 percent of the theoretical density for β''-alumina comprising:

1. mixing between about 2.5 parts by weight and about 4.5 parts by weight of a ceramic composition comprising at least about 80 weight percent of aluminum oxide, between about 5 and about 15 weight percent of sodium oxide and between about 0.1 and 5 weight percent of lithium oxide, magnesium oxide or a mixture thereof with 1 part by weight of a binder composition consisting essentially of between about 20 weight percent and about 35 weight percent of polyvinyl pyrrolidone having a molecular weight of between about 30,000 and about 50,000 and between about 80 weight percent and about 65 weight percent of ethylene glycol;
2. extruding the mixture so formed through a die of the desired configuration at a pressure of between about 3000 psi and about 50,000 psi at a rate of between about 0.25 inch/min. and for about 50 inch/min.

4,020,135

DYEABLE RUBBER PRODUCTS

V. Lindsay Chase, Butler, N.J., assignor to J. P. Stevens & Co., Inc., New York, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,615
Int. Cl.² D01F 1/06
U.S. Cl. 264—78 6 Claims

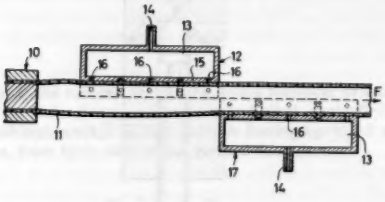
4. A process for preparing rubber threads which are receptive to disperse dyes comprising mixing 100 parts by weight of uncured rubber with about 2 to 15 parts by weight of powdered dimethyl terephthalate, forming the mixture of rubber and dimethyl terephthalate into thin sheets, curing the rubber in said sheets and slitting said sheets to form threads.

4,020,136

METHOD AND APPARATUS FOR THE SIZING OF TUBULAR BODIES OF A THERMOPLASTIC MATERIAL WHICH ARE CONTINUOUSLY EXTRUDED

Giosue Zaro, Via Adua, 21, Lonate Pozzolo, Varese, Italy

Continuation-in-part of Ser. No. 27,333, April 10, 1970, abandoned. This application Sept. 14, 1972, Ser. No. 289,140
Claims priority, application Italy, Apr. 12, 1969, 15501/69
Int. Cl.² B29C 17/07
U.S. Cl. 264—89 10 Claims



1. A method for the sizing of a tubular blank of a thermoplastic material in a sizing tool, said method comprising extruding the tubular blank through an extrusion head from which the blank exits in a plastic state, and subjecting the plastic blank to the action of a vacuum, in sequence, first over no more than a fraction of its outer surface so as to press said fraction only against part of the sizing tool which is provided with a cross-sectional outline for said fraction of the finished tubular article, and subsequently subjecting the balance of the plastic blank to a vacuum to press said balance against the balance of the sizing tool to give the balance of the blank its finished shape, that part of the blank which is not subjected to vacuum being subjected to ambient atmospheric conditions.

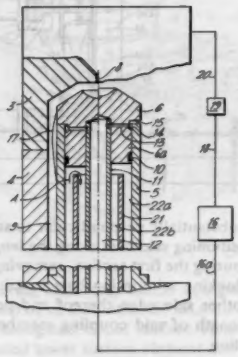
6. A device comprising an extrusion head for extruding a tubular blank of thermoplastic material, first and second sizing tools arranged in sequence downstreams of said head and angularly displaced with respect to one another around the longitudinal axis of the extruded blank, said tools being located at such a distance from the extrusion head that the thermoplastic material is plastically deformable when received by said tools, each of said two tools having a cross-sectional profile substantially corresponding to a corresponding fraction of a cross-sectional profile desired for a finished extrudate, said tools each having a set of openings adapted for communication with a vacuum source.

4,020,137

METHOD OF INJECTION MOULDING HOLLOW PREFORMS

Otto Lachner, Kempten; Ludwig Beyerlein, Lenzfried, and Klaus Spelthahn, Kempten, all of Germany, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 423,953, Dec. 12, 1973, abandoned. This application June 23, 1975, Ser. No. 589,316
Int. Cl.² B29C 17/07; B29F 1/00
U.S. Cl. 264—90 3 Claims



1. A method for injection moulding a hollow preform of thermo-plastic material comprising the steps of:

a. heating the thermo-plastic material to a desired injection moulding temperature;

b. injecting the heated thermo-plastic material under pressure through an injection nozzle into an injection mould having an annular core cavity formed by the presence of a mandrel having a blowing channel therein and an outlet communicating with the annular core cavity and a valve means displaceable to open and close said outlet to allow a desired intermittent communication between the blowing channel and annular core cavity, said communication being closed throughout the injection moulding of thermo-plastic material;

c. applying a vacuum within the blowing channel before the injection pressure on the preform is released to prevent leakage of air through the outlet, where not closed in an airtight manner, from the blow channel into the annular core cavity;

d. maintaining the application of said vacuum within said blowing channel until the preform has completely cooled to set, whereby separation of said preform from said mandrel due to shrinkage is prevented;

e. removing the hollow preform from the injection mold while being carried on the mandrel; and

f. adjusting the temperature of the preform to that required for its subsequent processing while the preform is in contact with the mandrel.

4,020,138

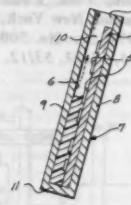
CAST IMPREGNATED MOLDING PLATE FOR MOLDING PRINTING PLATES

Raphael Daniel Nettesheim, New Berlin, and Robert R. Guyer, Hartland, both of Wis., assignors to Schwaab, Inc., Milwaukee, Wis.

Filed June 9, 1975, Ser. No. 584,696
Int. Cl.² B29C 13/04
U.S. Cl. 264—130 7 Claims

1. A method of making a molding plate for use in molding a printing plate, comprising the steps of placing a type form sheet having a surface bearing raised indicia in a mold cavity with the sheet being at an acute angle to the vertical and said indicia facing upwardly, said surface being spaced from a wall

of the mold to provide a clearance therebetween, applying a coating of graphite to said surface of the type form sheet, introducing a liquid thermosetting resin into said cavity with the air expelled into said clearance and being discharged from



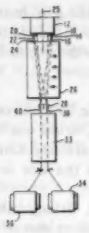
the upper end of the cavity, curing the resin to form a cured thermosetting resin molding plate having a molding surface with recessed indicia, and impregnating the graphite into the mold surface during curing of said resin.

4,020,139

PROCESS FOR MELT SPINNING A PLURALITY OF ECCENTRIC SHEATH-CORE FILAMENTS

Roger Allen Ross, and Donald Rittler Strachan, both of Martinsville, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 1, 1976, Ser. No. 672,714
Int. Cl.² B29F *3/10*; B32B *31/30*
U.S. Cl. 264—171 **10 Claims**



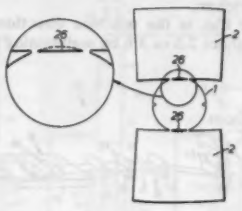
1. In a process of melt spinning a plurality of filaments each having a core component eccentrically disposed within a sheath component, the eccentricity of the core component within the sheath component providing the sheath component with a cross section varying from a thin region to a thick region relative to one another, gas quenching said filaments and converging said filaments together into yarn, wherein the converging filments stick together where a thin sheath region of one filament contacts a thin sheath region of another filament, but wherein sticking does not occur between contacting thin-thick or thick-thick regions of respective contacting filaments, the improvement comprising selecting the filaments to be converged into said yarn to avoid contact between the thin sheath regions of the filaments during convergence, the number of filaments required for said yarn being at least three and requiring the convergence into at least one bundle to avoid said contact, said one bundle being said yarn when the number of filaments therein is equal to the number required for said yarn, and when more than one bundle is formed by said convergence to obtain avoidance of said contact, converging the resultant bundles together into said yarn, whereby neither the thin sheath regions nor any other regions of the filaments in said yarn stick together.

4,020,140

METHOD OF MAKING A FRUSTO-CONICAL CONTAINER HAVING REDUCED DISTORTION TENDENCIES FROM A BLANK SEAMED BY INJECTION MOLDING

Kenneth Francis Rumball, Great Bookham, England, assignor to Airfix Industries Limited, London, England

Filed June 2, 1975, Ser. No. 582,898
Int. Cl.² B29D *23/02*; B29F *1/10*
U.S. Cl. 264—261 **3 Claims**



1. In the method of making from a substantially planar blank of paper, card or board material a container having at least a part thereof of a curved shaped and juxtaposed edges of the blank joined together by a seam of injected molded material and wherein during the making of the container the blank is constrained in a blank cavity with its edges juxtaposed in a mold cavity, said cavities conforming to the final shape of the finished container and being defined between closed core and cavity tools of an injection molding machine, a curved part of one of said tools being on the concave side of the curved part of said blank and a complementarily curved part of the other of said tools being on the convex side of the curved part of said blank, said blank material having inherent resiliency tending to return it to its planar condition when constrained to a curved shape, the improvement comprising providing the surface of the mold tool on the concave side of the curved part of the blank with surface deforming means and providing the other mold tool with a substantially smooth surface, pressing the mold tools against the inner and outer surfaces of the blank until the concave side of the curved part of the blank is deformed by said surface deforming means, and thereafter injecting molten plastic material into said mold cavity to seam the juxtaposed edges of the blank material, the surface deformation of the concave side of the blank material by said surface deforming means being sufficient to reduce the inherent resiliency of the blank tending to return it to its planar condition and thereby reduce the strain on each seam between juxtaposed edges of the blank due to said inherent resiliency of said blank material.

4,020,141

METHOD OF MAKING HEAT-SEALABLE, HEAT-SHRINKABLE, BIAXIALLY ORIENTED POLYESTER FILM

James Maurice Quinn, Chillicothe, Ohio, and Allen Gregg Kirk, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 478,972, June 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 397,311, Sept. 14, 1973, abandoned. This application Mar. 5, 1975, Ser. No. 555,447
Int. Cl.² B29D *7/24*
U.S. Cl. 264—289 **2 Claims**

1. A method of making a heat-sealable, heat-shrinkable biaxially oriented polyester film, such film being usable in making shrink packages having improved seals and improved optics, such method including the steps of:

forming a polymer consisting primarily of poly(ethylene terephthalate) with additional monomeric units selected from a second glycol and/or a second acid such polymer having a relative viscosity (at 1% concentration in 60/40 tetrachloroethane/phenol at 30° C.) of at least 1.80 and a melting point of from about 215° C. to 230° C.;

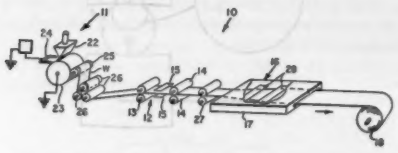
casting a molten web of the polymer onto a cooled quenching surface to cool it below its glass transition temperature and thereby form a film;

stripping the film from the quenching surface;

heating the film to a temperature from about 60° to 80° C. by passage between and contact with slow nip rolls of a nip-roll stretcher;

further heating the film to a temperature from about 65° to 85° C. by radiant heat after emergence from the slow nip rolls, but before engagement with fast nip rolls of the nip-roll stretcher;

stretching the film in the machine direction by a stretch ratio from about 2.5 to 3.6 by maintaining the peripheral



velocity of the fast nip rolls greater than the slow nip rolls by a factor equivalent to the stretch ratio, the stretching span being substantially less than the distance between the slow and fast nip rolls;

preheating the film from about 50° to 80° C. prior to entering a tenter frame for transverse stretching;

stretching the film in the tenter frame while heating such film at from about 50° to 85° C. so that the portion of the film subjected to stretching is stretched in the cross-machine direction by a factor of from about 2.9 to 4.0;

further heating the stretched film in the tenter frame to a temperature from about 65° to 100° C. while permitting the film to relax in width by a factor from about 0 to 5.0% its stretched width.

4,020,142

CHEMICAL MODIFICATION OF POLYBENZIMIDAZOLE SEMIPERMEABLE

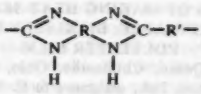
Howard J. Davis, and Norman W. Thomas, both of Warren, N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Aug. 21, 1975, Ser. No. 606,617

Int. Cl.² C08G *73/18*; B01D *39/00*

U.S. Cl. 264—347 **19 Claims**

1. A process for chemically modifying a preformed polybenzimidazole semipermeable membrane wherein said polybenzimidazole is soluble in N,N-dimethylacetamide and consists essentially of recurring units of the formula:



wherein R is a tetravalent aromatic nucleus, with the nitrogen atoms forming the benzimidazole rings paired upon adjacent carbon atoms of said aromatic nucleus, and R′ is selected from the group consisting of (1) an aromatic ring, (2) an alkylene group having from 4 to 8 carbon atoms, and (3) a heterocyclic ring selected from the group consisting of (a) pyridine, (b) pyrazine, (c) furan, (d) quinoline, (e) thiophene, and (f) pyran, comprising contacting said membrane with a strong polybasic acid having a pK_A value below 4 or its acid halide which is dissolved in a relatively mild acid medium having a pK_A value of about 4 to 5 in a concentration sufficient to form a cross-linked polybenzimidazole which is not soluble in N,N-dimethylacetamide wherein said polybasic acid or acid halide reacts with the imidazole groups of said polybenzimidazole membrane.

4,020,143

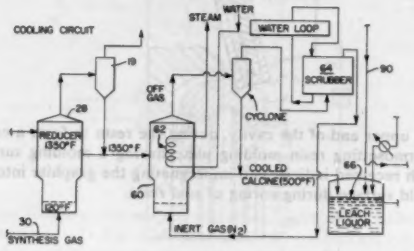
USE OF RAW MANGANESE NODULES FOR OXIDATION LEACHING OF REDUCTIVELY ROASTED MANGANESE NODULES

Robert E. Lueders, Needham; Roger N. Kust, Acton, both of Mass., and Lester J. Szabo, York, Canada, assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Aug. 26, 1974, Ser. No. 500,492

Int. Cl.² C01G *3/14*, *51/12*, *53/12*, *39/00*

U.S. Cl. 423—32 **46 Claims**



1. A process for treating a manganese ore containing copper and nickel base metal values to enable the copper and nickel base metal values in the ore to be recovered comprising the steps of calcining the ore to convert the MnO_2 to intermediate oxides of manganese, reducing the calcined ore to convert the intermediate oxide of manganese to MnO, leaching the reduced ore with an ammoniacal-ammonium carbonate leach solution to produce a leach solution containing copper and nickel metal values, and oxidizing metal values in the leach solution with raw manganese nodules to convert metal values in the leach solution to a higher oxidation state and to enable the metal values in the raw nodules to be leached in the leach solution.

12. A process for treating a manganese ore containing copper and nickel base metal values to enable the copper and nickel base metal values in the ore to be recovered comprising the steps of:

a. grinding the ore;

b. drying the ground ore to remove free moisture;

c. calcining the ground, dried ore in a fluid bed to remove remaining free moisture and combined moisture and to convert the MnO_2 in the ore to intermediate oxides of manganese;

d. reducing the ground, dried, calcined ore in a fluid bed reducer to convert the oxides of manganese in the ore to MnO;

e. introducing the reducer product from the fluid bed reducer into an ammonia-ammonium carbonate leach liquor containing cupric copper to oxidize the metals in the reducer product to a higher oxidation state in which they become solubilized in the leach liquor while the cupric copper is reduced to cuprous copper; and,

f. oxidizing the cuprous copper produced in step (d) with raw manganese nodules to convert the cuprous copper to cupric copper and to enable the metal values in the raw nodules to be leached.

4,020,144

METHOD FOR REMOVAL OF GASEOUS SULFUR AND NITROGEN COMPOUNDS FROM GAS STREAMS

David S. Bosniack, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 574,182, May 2, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,793

Int. Cl.² B01D *53/34*

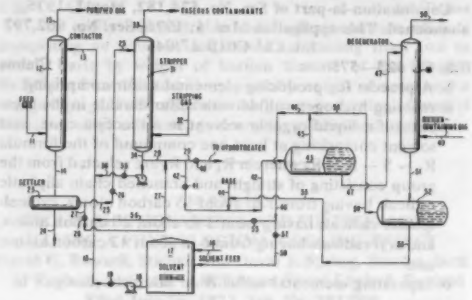
U.S. Cl. 423—226 **25 Claims**

1. A process for removing a gaseous constituent selected from the group consisting of gaseous sulfur and nitrogen com-

pounds from a mixture of gases containing said gaseous constituent in combination with at least one other gas comprising:

a. contacting said mixture of gases with a liquid organic solvent in a contacting zone, said solvent comprising at least one compound of the formula $R_1 - S - S - R_2$ wherein R_1 and R_2 are selected from the group consisting of straight and branched chain aliphatic radicals having from 1 to about 15 carbon atoms, cycloaliphatic radicals having from 3 to about 20 carbon atoms, and aryl radicals having from 6 to about 42 carbon atoms; and

b. withdrawing gas from which said gaseous constituent has been removed from said contacting zone.



4,020,145
CARBON FIBER PRODUCTION

John W. Soehngen, Berkeley Heights, and Albert G. Williams, West Orange, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Continuation of Ser. No. 324,695, Jan. 18, 1973, abandoned. This application Mar. 12, 1975, Ser. No. 557,519
Int. Cl.² C01B *31/07*
U.S. Cl. 423—447.4 21 Claims

1. A process for producing a pyrolyzed carbonaceous filamentary material comprising:

a. providing a homogeneous molten blend comprising 1 part by weight of polystyrene exhibiting a number average molecular weight of about 100,000 to 300,000 and 0.25 to 1.5 part by weight of pitch exhibiting a mean molecular weight of about 400 to 2,000,

b. extruding said homogeneous molten blend through a spinneret having at least one extrusion orifice,

c. passing the resulting extruded molten blend in the direction of its length through a solidification zone provided with a gaseous atmosphere at a temperature below 80° C. wherein said extruded molten blend is transformed to a solid filamentary material,

d. hot drawing said resulting solid filamentary material at least 2 times its as-spun length while maintained below the temperature at which coalescence of filaments occurs,

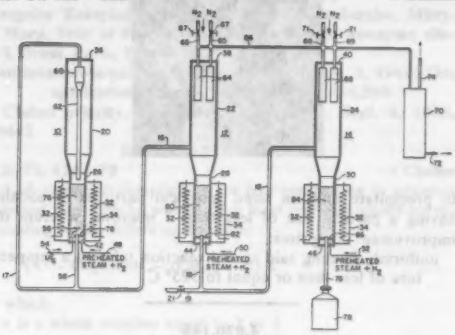
e. thermally stabilizing said resulting hot drawn filamentary material to render the same capable of undergoing carbonization, said thermal stabilization comprising the sulfonation of said hot drawn filamentary material, and

f. heating said resulting stabilized filamentary material to a temperature of at least 1000° C. in an inert atmosphere where it is maintained until a pyrolyzed carbonceous filamentary material is formed which contains at least about 98 percent carbon by weight.

4,020,146
PRODUCTION OF URANIUM DIOXIDE

Irving E. Knudsen, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 843,062, July 18, 1969, abandoned. This application July 5, 1973, Ser. No. 376,847
The portion of the term of this patent subsequent to Dec. 15, 1987, has been disclaimed.
Int. Cl.² C01G *43/02;* G21C *3/00*
U.S. Cl. 423—261 9 Claims



8. A process for converting uranium hexafluoride continuously to high quality ceramic-grade uranium dioxide having very low residual fluoride values comprising the steps of:

a. establishing and maintaining in contact with a first fluidized bed a gaseous mixture of from about 18 to 24 lbs./hr. of UF_6, about 6.3 lbs./hr. of steam and of from about 0.48 to 0.55 lbs./hr. of hydrogen,

b. concurrently heating the bed to a temperature ranging from about 475° to about 600° C to produce first intermediate reaction products including UO_2F_2 and U_3O_8,

c. conveying the first intermediate reaction products to a second fluidized bed,

d. establishing and maintaining a second fluidized bed comprising a mixture of the intermediate reaction products from step (b) in contact with steam ahd hydrogen, there being introduced about 12.8 lbs./hr. of steam and about 0.38 lbs./hr. of hydrogen,

e. concurrently heating the second fluidized bed to a temperature ranging from about 575° to 650° C to produce second intermediate reaction products including U_3O_8 and UO_2,

f. conveying the second intermediate reaction products to a third fluidized bed,

g. establishing and maintaining a third fluidized bed comprising a mixture of the second-intermediate reaction products from step (e) in contact with steam and hydrogen, there being introduced about 12.8 lbs./hr. of steam and about 0.38 lbs./hr. of hydrogen, and

h. concurrently heating the third fluidized bed to a temperature ranging from 575° to 650° C to produce fine particles of ceramic-grade UO_2 capable of being readily formed into compacts and fired into pellets having a density of 90 to 96% of theoretical density and having residual fluorine values of not over about 0.015 weight percent.

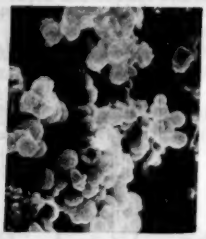
4,020,147
METHOD FOR PREPARING CATHODOCHROMIC SODALITE

Igal Shidlovsky, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 2, 1975, Ser. No. 583,185
Int. Cl.² C01B *33/26;* C09K *11/08*
U.S. Cl. 423—329 10 Claims

1. In a hydrothermal growth process for preparing sodalite particles which includes the steps of uniformly heating a

sealed reaction tube containing a water slurry of Al_2O_3, SiO_2, NaOH and NaX wherein X is at least one member of the group consisting of Cl−, Br−, and I−; continuing said uniform heating for an extended period of time to allow for the dissolution of Al_2O_3 and SiO_2; and rapidly cooling said reaction tube so as



to precipitate uniform sized spherical particles of sodalite having a particle size of less than 7 microns, wherein the improvement comprises:

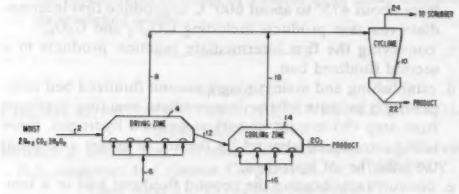
uniformly heating said sealed reaction tube to a temperature of less than or equal to 325° C.

4,020,148

PROCESS FOR DRYING SODIUM CARBONATE PEROXIDE

Richard A. Mohr, Martinsville; Sushil K. Bhalla, Princeton, both of N.J., and Peter H. Zeh, Williamsville, N.Y., assignors to FMC Corporation, Philadelphia, Pa.

Filed July 15, 1975, Ser. No. 596,200
Int. Cl.² C01B *15/10*
U.S. Cl. 423—415 P **4 Claims**



1. In a process of manufacturing a dry, free-flowing, crystalline sodium carbonate peroxide product by reacting hydrogen peroxide and sodium carbonate in an aqueous medium, crystallizing, recovering and drying the resulting moist sodium carbonate peroxide product, the improvement in reducing the loss of active oxygen during drying which comprises:

a. passing the moist sodium carbonate peroxide into a drying zone, passing a heated gas stream at a temperature between 70° and 150° C into said drying zone, maintaining the temperature of the exit gas from said drying zone at a reduced temperature between 50° and 130° C, maintaining the sodium carbonate peroxide within said drying zone in contact with said heated gas stream until the sodium carbonate peroxide contains between 0.05 and 0.5% by weight residual moisture;

b. rapidly cooling the hot sodium carbonate peroxide by passing the dried sodium carbonate peroxide into a cooling zone, passing a gas stream at a temperature between −20° and 40° C into said cooling zone, maintaining the temperature of the exit gas from said cooling zone at an increased temperature between 0° and 50° C; maintaining the sodium carbonate peroxide within said cooling zone in contact with said gas stream until the sodium carbonate peroxide is cooled to between 0° and 40° C, and the sodium carbonate peroxide has a lowered residual moisture content, and recovering the cooled material as a stable, dry, free-flowing, crystalline sodium carbonate peroxide product containing between 0.001% and 0.20% by weight residual moisture.

4,020,149

PROCESS FOR THE PRODUCTION OF SULFUR

David S. Bosniack, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 574,182, May 2, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,792
Int. Cl.² C01B *17/04*
U.S. Cl. 423—575 **8 Claims**

1. A process for producing elemental sulfur comprising:

a. reacting hydrogen sulfide with sulfur dioxide in the presence of a liquid organic solvent in a reaction zone, said solvent comprising at least one compound of the formula $R_1 — S — S — R_2$ wherein R_1 and R_2 are selected from the group consisting of straight and branched chain aliphatic radicals having from 1 to about 15 carbon atoms, cycloaliphatic radicals having from 3 to about 20 carbon atoms, and aryl radicals having from 6 to about 42 carbon atoms; and

b. separating elemental sulfur from said solvent.

4,020,150

ADMINISTRATION OF SILVER SULFADIAZINE AND RADIOACTIVE DERIVATIVES THEREOF

Michael S. Wysor, New York, N.Y., assignor to Michael Ebert, Mamaroneck and Eugene J. Kalil, New York, both of, N.Y., part interest to each

Continuation-in-part of Ser. No. 415,637, Nov. 14, 1973, abandoned. This application Dec. 19, 1974, Ser. No. 534,288
Int. Cl.² A61K *43/00, 31/63;* **A61L** *13/00*
U.S. Cl. 424—1 **4 Claims**

1. A method of treating systemic infections such as malaria comprising the step of administering an aqueous suspension of insoluble silver sulfadiazine particles orally or subcutaneously in a dosage which is effective against the infection and has minimal toxicity.

3. A method of eradicating neoplastic tissue in living bodies comprising the steps of internally administering an aqueous suspension of insoluble particles consisting essentially of a radioactive derivative of silver sulfadiazine in a dosage of minimal toxicity which is sufficient to cause said particles to lodge in said tissue and eradicate same.

4,020,151

METHOD FOR QUANTITATION OF ANTIGENS OR ANTIBODIES ON A SOLID SURFACE

Gunner Bolz, Santa Clara; Fred H. Deindoerfer, Northridge; Chun P. Hu, Santa Clara; Naomi Kameda, Foster City, and Robert Wang, San Jose, all of Calif., assignors to International Diagnostic Technology, Inc., Santa Clara, Calif.

Filed Feb. 17, 1976, Ser. No. 658,298
Int. Cl.² G01N *33/00, 33/16;* **G21H** *5/02*
U.S. Cl. 424—1.5 **10 Claims**

1. In a method for quantitation of antigens or antibodies in a liquid sample, the steps of

a. sorbing said sample antibody or antigen directly onto an immunologically unreactive solid support surface sorptive for said sample antibody or antigen,

b. exposing the sorbed surface to an aqueous reagent including an excess of labelled specific antibody or antigen immunologically reactive with said sample antigen or antibody to cause said immunological reaction to occur on said surface,

c. removing the unreacted reagent from said surface, and

d. measuring the quantity of reacted labelled antigen or antibody on said surface.

4,020,152

BARIUM TITANATE AND BARIUM ZIRCONATE IN RADIOLOGICAL CONTRAST PRODUCTS

Fernand Alfred Désiré Heitz, Saint-Mande, France, assignor to Thann & Mulhouse, Thann, France

Filed Dec. 19, 1973, Ser. No. 426,016
Claims priority, application France, Dec. 19, 1973, 73.45166
Int. Cl.² A61K 29/02
U.S. Cl. 424—4 24 Claims

1. An orally administrable radiological contrast product comprising an aqueous suspension containing from two to twenty parts by weight of barium titanate of the formula $BaTiO_3$ in from two to twenty parts by weight of water and a stabilizing agent selected from the group consisting of methyl cellulose, ethyl cellulose, gum arabic, gelatin and agar-agar.

4,020,153

CYCLIC SULPHONAMIDES AND SULPHINAMIDES HAVING A PHYSIOLOGICAL COOLING EFFECT

David G. Rowsell, Staines, and David J. Spring, Datchet, both of England, assignors to Wilkinson Sword Limited, England

Filed July 20, 1973, Ser. No. 381,099
Claims priority, application United Kingdom, July 20, 1972, 33993/72
Int. Cl.² A61K 7/16, 31/18
U.S. Cl. 424—49 11 Claims

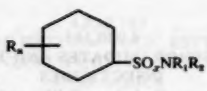
1. In a comsumer product manufactured for application to or consumption by the human person and being:

a. a personal care product comprising a topically or orally administrable base medium containing a flavourant, perfume or antiseptic ingredient;

b. a pharmaceutical preparation comprising a topically or orally administrable base medium containing a pharmaceutically active ingredient; or

c. a tobacco-containing consumer product;

said consumer product is also containing an ingredient capable of stimulating the cold receptors of the nervous system of the surface tissues of the body when brought into contact therewith by application or consumption of the said consumer product, the improvement which comprises using as the cold receptor stimulating ingredient an effective amount of a cold receptor stimulating cyclic sulphonamide or sulphinamide of the formula:



where

R is C_1–C_3 alkyl;

R_1 and R_2, when taken separately, are each hydrogen, C_1–C_6 alkyl or C_1–C_6 hydroxyalkyl, and together provide a total of no more than 6 carbon atoms, with the proviso that when $R_1$is hydrogen R_2 may also be alkylcarboxyalkyl or up to 6 carbon atoms;

x is an integer of from 1–2 inclusive; and

n in an integer of from 1–4 inclusive.

4,020,154

MANUFACTURE OF GAS-FREE DENTIFRICE

Giulio Perla; Giuseppe Mannara, and Domenico Milesi, all of Rome, Italy, assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 325,804, Jan. 22, 1973, abandoned. This application Dec. 9, 1974, Ser. No. 531,254
Int. Cl.² A61K 7/16
U.S. Cl. 424—49 13 Claims

1. In a method for the manufacture of a dentifrice by mixing a gel of a gelling agent and a polyhydric alcohol with a powdered polishing agent which is at least ten percent of the dentifrice, an improvement for obtaining the dentifrice in gas-free form which comprises preparing the gel in gas-free form, applying vacuum to the gel and admixing it under vacuum with degassed powdered polishing agent.

4,020,155

SURFACE ACTIVE AGENTS

Gregoire Kalopissis, Paris, and Guy Vanlerberghe, Mitry-Mory, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Continuation-in-part of Ser. No. 576,852, Sept. 2, 1966. This application Apr. 15, 1971, Ser. No. 134,390
Claims priority, application Luxembourg, Sept. 6, 1965, 49442
Int. Cl.² A61K 7/06, 7/09
U.S. Cl. 424—70 3 Claims

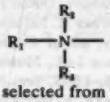
1. A cosmetic composition for hair comprising in aqueous solution 1 to 10% by weight of at least one compound corresponding to the following formula:

$$[A^+ - CH_2CONH - (CH_2)_n - B]\ X^-$$

in which:

n is a whole number equal to 2 or 3

A represents a radical of the formula:

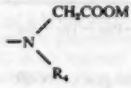


in which R_1 is a radical selected from the group consisting of: methyl, cetyl and a radical derived from copra fatty acid having 6 – 18 carbon atoms;

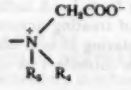
R_2 and R_3 are selected from the group consisting of: alkyl and hydroxy-alkyl radicals having 1 to 3 carbon atoms;

B is a radical selected from the group consisting of:

a)



and b)



in which R_4 is selected from the group consisting of alkyl and hydroxy alkyl radicals having 1 – 3 carbon atoms and a radical derived from copra fatty acid having 6 – 18 carbon atoms; R_5 is a lower alkyl radical having from 1 to 3 carbon atoms, and M represents an alkali metal selected from the group consisting of potassium and sodium, and X^- is a chloride ion.

4,020,156

CONTROLLED FRAGRANCE RELEASING CRYSTAL BEADS

Thomas E. Murray, Rockaway Township, N.J., and Vincent T. Bocchino, Port Chester, N.Y., assignors to Norda Incorporated, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 658,038
Int. Cl.² A61K 7/46, 7/50; A61L 9/01
U.S. Cl. 424—76 8 Claims

1. A fragrant bead composition which comprises a multiplicity of prilled urea beads having an adherent surface coating consisting essentially of:

a. finely divided particles of an adsorbent selected from the group consisting of calcium silicate, magnesium carbonate and silicon dioxide, said particles having a surface

area of from about 80 to about 400 square meters per gram and containing a fragrance adsorbed therein, and

b. dextrin, as a binder; said adsorbent being present in the composition in a ratio of from about 1 to 5 parts per 100 parts by weight of urea and being present in the coating in a ratio of about 0.2 to 2 parts per part by weight of dextrin, and the fragrance being present in a ratio of from 1 to 3 parts per part by weight of adsorbent.

8. A deodorant pet litter bead composition comprising a multiplicity of prilled urea beads having an adherent surface coating consisting essentially of:

a. finely divided adsorbent synthetic calcium silicate particles having a surface area of from about 80 to about 400 square meters per gram containing a germicide and a fragrance adsorbed therein,

b. dextrin as a binder, and

c. a food approved color;

the silicate being present in the composition in a ratio of from about 1 to 5 parts per 100 parts by weight of urea and being present in the coating in a ratio of about 0.2 to 2 parts per part by weight of dextrin, the fragrance being present in a ratio of from 1 to 3 parts per part by weight of silicate, and the germicide being present in a ratio of from about 0.1 to 0.5% based on the weight of the urea.

4,020,157

SHORTENED ANALOGS OF SOMATOSTATIN

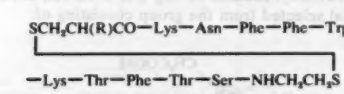
Nedumparambil A. Abraham, Dollard Des Ormeaux; Hans U. Immer, Mt. Royal; Verner R. Nelson, Kirkland, and Kazimir Sestanj, Pointe Claire, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Filed July 8, 1975, Ser. No. 594,159

Int. Cl.² A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **36 Claims**

8. A compound of the formula 1



in which R is hydrogen or NHR^1 wherein R^1 is a lower aliphatic acyl having from 1 – 6 carbon atoms, or benzoyl.

26. A method of treating acromegaly in mammals, which comprises administering to said mammal an effective dose of a compound of the formula 1 as claimed in claim **8.**

4,020,158

INCREASING METALS IN BIOLOGICAL TISSUE

Harvey H. Ashmead, 719 E. Center St., Kaysville, Utah 84037, and Paul A. Little, P.O. Box 172, Avivacao, Ariz. 85601

Continuation-in-part of Ser. No. 607,370, Aug. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 420,033, Nov. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 739,141, June 24, 1968, abandoned. This application Feb. 17, 1976, Ser. No. 658,243

Int. Cl.² A61K *37/00, 31/295*

U.S. Cl. 424—177 **14 Claims**

1. A method of raising the levels of essential bivalent metals in the tissues of animals which comprises administering to said animal an effective amount of exogenously synthesized metabolically assimilable metal proteinates, said proteinates being in the form of chelates of said metals with one or more protein hydrolysates selected from the group consisting of polypeptides, peptides and amino acids wherein said proteinates are formed by dissolving salts of said metals in an aqueous solution containing the protein hydrolysates and adding sufficient base to raise the ph to a value between about 7.5 and 10 to precipitate said metal proteinates.

4,020,159

METHODS OF AND MEDICATIONS FOR TREATING CARDIAC DISORDERS BY USING STROPHANTHIN

Joseph Peter Herrmann, Wiesbaden, Germany, assignor to Apotheker A. Herbert K.G., Fabrik Pharmazeutischer Praparate Wiesbaden, Wiesbaden, Germany

Filed Oct. 8, 1974, Ser. No. 513,151

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **10 Claims**

1. An orally administrable medication for treating angina pectoris, heart collapse, hypertonicity, and arrhythmia which comprises g-strophanthin distributed in an oleophilic vehicle in an amount and concentration effective to produce a threshhold myocardial concentration of the g-strophanthin via absorption through mucous membranes, the concentration of the g-strophanthin in the oleophilic vehicle ranging from three to twenty percent based on the total weight of the medication, and said oleophilic vehicle containing from 60 to 90 percent by weight of a stable, physiologically harmless fatty oil or mixture of fatty oils; from 2 to 20 percent by weight of a wax or wax mixture for adjusting and stabilizing the physical properties of the vehicle; and a lecithin in an amount ranging from 2–20 percent by weight and sufficient to reduce the irritating effect of the strophanthin on mucous tissue and to stabilize the dispersion of the strophanthin in the vehicle.

4,020,160

CYCLODEXTRIN SULFATE SALTS AS COMPLEMENT INHIBITORS

Seymour Bernstein, New City, N.Y.; Joseph Peter Joseph, Cliffside Park, N.J., and Vijay Nair, Nanuet, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 15, 1975, Ser. No. 604,986

Int. Cl.² A61K *31/715*

U.S. Cl. 424—180 **7 Claims**

1. A method of inhibiting the complement system in a warm-blooded animal in need of such therapy which comprises internally administering to said animal an effect complement inhibiting amount of a pharmaceutically acceptable cyclodextrin polysulfate salt.

4,020,161

THIOLOPHOSPHORAMIDATES AND THEIR USE AS INSECTICIDES

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 31, 1976, Ser. No. 672,191

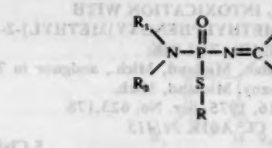
Int. Cl.² A01N *9/36;* **C07C** *9/24*

U.S. Cl. 424—211 **20 Claims**

1. A compound having the formula

in which R and R_1 are lower alkyl, R_2 and R_3 are independently hydrogen or lower alkyl, provided that at least one of R_2 and R_3 is lower alkyl, and R_4 is amino or lower alkoxy.

14. A method for controlling insects comprising applying to the insect or habitat thereof an insecticidally effective amount of the compound having the formula



in which R and R_2 are lower alkyl, R_2 and R_3 are independently hydrogen or lower alkyl, provided that at least one of R_2 and R_3 is lower alkyl, and R_4 is amino or lower alkoxy.

4,020,162

OXYTETRACYCLINE SOLUTION FOR PARENTERAL, PERORAL AND LOCAL ADMINISTRATION AND PROCESSES FOR THE PRODUCTION THEREOF

Hans Peter Ghilardi, Therwil, and Kaya Atasoy, Munchenstein, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 7, 1975, Ser. No. 548,051

Claims priority, application Switzerland, Feb. 19, 1974, 2276/74

Int. Cl.² A61K *31/65*

U.S. Cl. 424—227 **7 Claims**

1. A process for the production of oxytetracycline solutions which comprises suspending 4–11% oxytetracycline in the form of the free base or the hydrochloride salt in 18–28% polyethylene glycol having a mean molecular weight of about 300 to 600, and thereafter admixing therewith in the presence of a nitrogen gas stream, 2.5–5.5% magnesium chloride, 1.3–4.3% of a base, 0.4–0.5% of a preservative, tris-(hydroxymethyl)-aminomethane-hydrochloride in a total concentration of 0.1–0.35% amino methane and 2.0–8.5% 0.1N HCl and 40–80%, by weight, of water; said concentration being based on the weight of the total solution.

2. An aqueous oxytetracycline solution for parenteral, peroral and local administration, which comprises, 4–11% of oxytetracycline in the form of the free base or the hydrochloride salt, 2.5–5.5% of magnesium chloride, 18–28% of polyethylene glycol having a mean molecular weight of about 300 to 600, 1.3–4.3% of a base, 0.4–0.5% of a preservative for said solution, tris-(hydroxymethyl)-aminomethane-hydrochloride in a total concentration of 0.1–0.35% aminomethane and 2.0%–8.5% 0.1N HCl, and 40 to 80% of water; said concentrations being based on the weight of the total solution.

4,020,163

USE OF HETEROCYCLIC ESTERS OF 5H-[1]BENZOPYRANO [3,4-b]PYRIDINES AS ANALGESICS

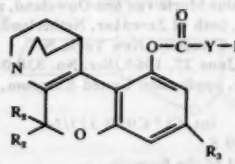
Louis Selig Harris, Richmond, Va.; Harry George Pars, Lexington, Mass.; Raj Kumar Razdan, Belmont, Mass.; John Clark Sheehan, Lexington, Mass., and Barbara Zitko Terris, Cambridge, Mass., assignors to Sharps Associates, Cambridge, Mass.

Division of Ser. No. 434,089, Jan. 17, 1974, Pat. No. 3,905,969. This application July 10, 1975, Ser. No. 594,713

Int. Cl.² A61K *31/44*, *31/54*, *31/445*, *31/535*

U.S. Cl. 424—248.55 **5 Claims**

1. A method which comprises administering to an animal, to induce an analgesic effect in the animal, a compound of the formulas



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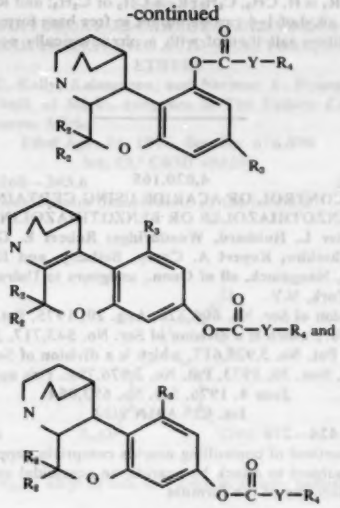
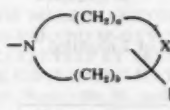


wherein R_2 is lower alkyl, R_3 is an alkyl having one to twenty carbon atoms, a cycloalkyl-lower alkyl or a phenyl-lower alkyl, Y is a straight or branched chain alkylene having one to eight carbon atoms, and R_4 is a group of the formula



wherein *a* is an integer from 1 to 4, *b* is an integer from 1 to 4 and X is CH_2, O, S or N-R_5 with R_5 being hydrogen or lower alkyl, and R_6 is hydrogen or a lower alkyl group bonded to a carbon in the ring, or a nontoxic pharmaceutically acceptable acid addition salt thereof, in an amount which is safe and effective in inducing an analgesic effect in the animal.

4,020,164

BENZOMORPHAN DERIVATIVES

Dieter Rahtz; Eberhard Schroder; Reinhard Horowski; Gert Paschelke; Dieter Palenschat; Helmut Wachtel, and Wolfgang Kehr, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

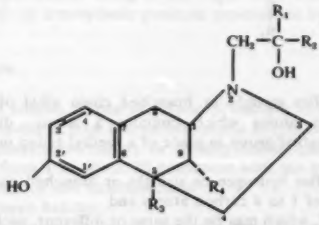
Continuation of Ser. No. 374,021, June 27, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,611

Claims priority, application Germany, June 30, 1972, 2233088

Int. Cl.² C07D *221/26*; A61K *31/445*

U.S. Cl. 424—267 **18 Claims**

1. A benzomorphan of the formula



wherein R_1 is H, CH_3, C_2H_5; R_2 is CH_3 or C_2H_5; and R_3 and R_4 each are alkyl of 1–4 carbon atoms, in free base form or as an acid addition salt thereof with a physiologically acceptable acid.

4,020,165

CONTROL OF ACARIDS USING CERTAIN BENZOTHIAZOLES OR BENZOTHIAZOLINES

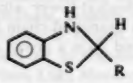
Winchester L. Hubbard, Woodbridge; Robert E. Grahame, Jr., Cheshire; Rupert A. Covey, Bethany, and Elmar H. Jancis, Naugatuck, all of Conn., assignors to Uniroyal Inc., New York, N.Y.

Division of Ser. No. 606,376, Aug. 20, 1975, Pat. No. 3,974,287, which is a division of Ser. No. 543,717, Jan. 24, 1975, Pat. No. 3,928,617, which is a division of Ser. No. 420,749, Nov. 30, 1973, Pat. No. 3,876,791. This application June 4, 1976, Ser. No. 693,054

Int. Cl.² A01N *9/22*

U.S. Cl. 424—270 **6 Claims**

1. A method of controlling acarids comprising applying, to a locus subject to attack by acarids, an acaricidal amount of benzothiazoline of the formula



where R is 1-naphthyl or 2-naphthyl.

4,020,166

HALOALKYL ESTERS OF 5-NITROIMIDAZOLE-1-CARBOXYLIC ACID DERIVATIVES

Hans Nesvadba, and Hellmuth Reinshagen, both of Vienna, Austria, assignors to Sandoz, Ltd., Basel, Switzerland

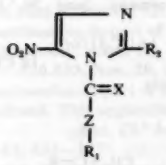
Filed Dec. 3, 1975, Ser. No. 637,312

Claims priority, application Switzerland, Dec. 6, 1974, 16233/74

Int. Cl.² C07D *233/94*

U.S. Cl. 424—273 **20 Claims**

1. A compound of the formula,



in which

R_1 signifies straight or branched chain alkyl of 1 to 12 carbon atoms which contains a mono-, di- or trihalomethyl group in place of a methyl group in the alkyl chain.

R_2 signifies hydrogen or straight or branched chain lower alkyl of 1 to 4 carbon atoms and

X and Z, which may be the same or different, each signifies oxygen or sulphur.

4,020,167

ETHANOL INTOXICATION WITH 2[(3-TRIFLUOROMETHYLPHENOXY)METHYL]-2-IMIDAZOLINE

Abdulmunien H. Abdallah, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 16, 1975, Ser. No. 623,178

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 **5 Claims**

1. A method for combatting ethanol intoxication and narcosis in mammals comprising administering internally to an intoxicated mammal an ethanol intoxication and narcosis antagonizing amount of 2((3-trifluoromethylphenoxy)methyl)-2-imidazoline or a pharmaceutically-acceptable salt thereof.

4,020,168

SUBSTITUTED 2,3-DIHYDRO-1,4-OXATHIIN PLANT GROWTH

Bruce A. Graham; Michael A. Puttock, both of Guelph; Ethel E. Fetauer, Arkell, all of Canada, and Robert W. Neidermyer, Cheshire, Conn., assignors to Uniroyal Inc., New York, N.Y. and Uniroyal, Ltd., Ontario, Canada

Division of Ser. No. 459,442, April 9, 1974, Pat. No. 3,947,264. This application Nov. 6, 1975, Ser. No. 629,731

Int. Cl.² C07D *327/06*

U.S. Cl. 260—327 P **8 Claims**

1. A chemical selected from the group consisting of 2,3-dihydro-5,6-diphenyl-1,4-oxathiin 4-oxide, 2,3-dihydro-5-(4-methylphenyl)-6-phenyl-1,4-oxathiin, 2,3-dihydro-5-(4-methylphenyl)-6-phenyl-1,4-oxathiin 4-oxide, 2,3-dihydro-5-(3-methylphenyl)-6-phenyl-1,4-oxathiin 4-oxide, 2,3-dihydro-5-(4-methoxyphenyl)-6-phenyl-1,4-oxathiin 4-oxide, 3-(4-chlorophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide, 3-(3-chlorophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide, 3-(4-bromophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide, 2-(4-fluorophenyl)-5,6-dihydro-3-phenyl-1,4-oxathiin 4-oxide, 3-(4-fluorophenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide and 3-(3,5-dimethylphenyl)-5,6-dihydro-2-phenyl-1,4-oxathiin 4-oxide.

4,020,169

PROCESS FOR PREPARING ARYL TRIFLUOROMETHYLSULFIDES

David C. Remy, North Wales, and Mark B. Freedman, Glenside, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 22, 1975, Ser. No. 642,865

Int. Cl.² C07D *335/16*; C07C *148/00*

U.S. Cl. 260—328 **8 Claims**

1. A process for the preparation of aryl trifluoromethylsulfides which comprises reacting an aryl iodide or aryl bromide with trifluoromethylthiocopper in an inert polar organic solvent at 50°–200° C. for 0.5 to 24 hours.

4,020,170

CERTAIN LOWER ALKYL 4,5-DIHYDROTHIOPHENE-3-THIOLS

Godefridus Antonius Maria van den Ouweland, and Hendricus Gerardus Peer, both of Zevenaar, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

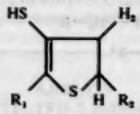
Filed June 27, 1969, Ser. No. 838,053

Claims priority, application United Kingdom, July 1, 1968, 31378/68

Int. Cl.² C07D *333/34*

U.S. Cl. 260—329 S **5 Claims**

1. A compound of the formula



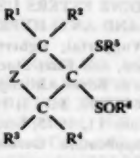
and the cis-trans isomers thereof; wherein R_1 and R_2 are selected from the group containing of hydrogen, methyl and ethyl and wherein R_1 and R_2 cannot both be hydrogen simultaneously.

4,020,171
CYCLIC KETONE MERCAPTAL S-OXIDES

Genichi Tsuchihashi, Tama, and Katsuyuki Ogura, Sagamihara, both of Japan, assignors to Sagami Chemical Research Center, Japan

Filed Feb. 25, 1975, Ser. No. 552,737
Claims priority, application Japan, Mar. 4, 1974, 49-24293; Mar. 4, 1974, 49-24294
Int. Cl.² C07D *317/06*
U.S. Cl. 260—340.5 **4 Claims**

1. A cyclic ketone mercaptal S-oxide of the formula



wherein R^1, R^2, R^3 and R^4, independently of each other, represent hydrogen or alkyl containing 1 to 5 carbon atoms, R^5 and R^6 represent alkyl containing 1 to 5 carbon atoms, and Z represents ethylene 1,2-substituted by isopropylidenedioxy.

4,020,172
LACTONE ALDEHYDES

Richard Philip Peel, and James Kenneth Sutherland, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 465,557, April 30, 1974, Pat. No. 3,952,019. This application Nov. 28, 1975, Ser. No. 636,296
Claims priority, application United Kingdom, May 15, 1973, 23045/73
Int. Cl.² C07D *311/94*
U.S. Cl. 260—343.2 R **2 Claims**

1. A lactone-aldehyde of the formula:

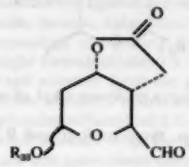
wherein R^3 is bromine, chlorine or iodine.

4,020,173
4α,6-DIHYDROXY-2β-CARBOXALDEHYDE-3α-TETRAHYDROPYRANACETIC ACID γ-LACTONE, 6-ALKYL ETHERS

Robert C. Kelly, Kalamazoo, and Norman A. Nelson, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 14, 1976, Ser. No. 676,890
Int. Cl.² C07D *493/04*
U.S. Cl. 260—343.6 **2 Claims**

1. A thromboxane intermediate of the formula



wherein R_{33} is alkyl of one to 5 carbon atoms, inclusive.

4,020,174
REACTIVATION OF MALEIC ANHYDRIDE PRODUCING PHOSPHORUS-VANADIUM-OXYGEN COMPLEX OXIDATION CATALYSTS BY TREATMENT WITH HALIDE CONTAINING MATERIALS

Walter Partenheimer, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sept. 24, 1975, Ser. No. 616,370
Int. Cl.² C07D *307/60*
U.S. Cl. 260—346.8 A **48 Claims**

1. In a process for the preparation of maleic anhydride from the oxidation of feed materials selected from the group consisting of alkanes, alkenes, or mixtures thereof or aromatics which comprises contacting said feed material and a gas containing molecular oxygen in the vapor phase with a solid catalyst comprising a phosphorus-vanadium-oxygen complex having from about 0.5 to about 5 atoms of phosphorus for each atom of vanadium, wherein the improvement comprises contacting said catalyst complex at reactivating conditions with an effective amount of a reactivating agent selected from the group consisting of:

A. Molecular halogens;

B. Organic halides being in the vapor state above about 250°

C. at atmospheric pressure represented by the formula:

$$c(X)n$$

where each X is selected halide and n is an integer from 1 to 4, any remaining radicals being hydrogen;

C. Organic halides being in the vapor state above about 250° C. at atmospheric pressure represented by the formula:

$$R(X_1)m$$

where R is alkane, alkene or alkyne of straight or branched structure having at least two carbon atoms and X_1 is independently a primary, secondary or tertiary halide and m is an integer of from 1 to about 20 consistent with the number of carbon atoms of said structure; and

D. Hydrogen halides;

or mixtures thereof to thereby enhance the selectivity of the catalyst for the production of maleic anhydride.

4,020,175
CERTAIN 3-FURYL SULFIDES

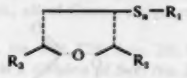
William John Evers, Long Branch, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

Continuation of Ser. No. 864,227, Oct. 6, 1969, abandoned, which is a continuation-in-part of Ser. No. 796,923, Feb. 5, 1969, Pat. No. 3,666,495. This application Oct. 10, 1972, Ser. No. 295,859

Int. Cl.² C07D *307/64*

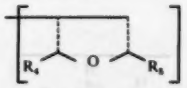
U.S. Cl. 260—347.2 9 Claims

1. A furan derivative having the formula



wherein R_3 is hydrogen or lower alkyl of one to five carbon atoms, and:

(1) *n* is one, two, three or four and R_1 is moiety of the formula



wherein R_4 is the same as R_2 and R_5 is the same as R_3 wherein each dashed line represents a single or double bond and the dashed line adjacent to R_4 has the same value as the dashed line adjacent to R_2 and the dashed line adjacent to R_5 has the same value as the dashed line adjacent to R_3, R_2 is lower alkyl of from two to five carbon atoms when *n* is two and R_2 is alkyl of from one to five carbon atoms when *n* is one, three, or four; or

(2) *n* is two or three, each dashed line is a single or double bond, and R_1 and R_2 are lower alkyl containing from one to five carbon atoms and provided that when *n* is two and R_1 and R_2 are methyl the dashed lines are not both double bonds.

4,020,176
HIGHLY FLUORINATED DIAZIDES AND PROCESS THEREFOR

Richard B. Greenwald, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed July 14, 1975, Ser. No. 595,488

Int. Cl.² C07C *117/00*

U.S. Cl. 260—349 6 Claims

1. A compound of the formula

$$N_3CH_2(CF_2)_xCH_2N_3$$

wherein *x* is a positive integer from 2 to 12.

4,020,177
SUBSTITUTED PHENOXY-TRIDECANOIC ACIDS

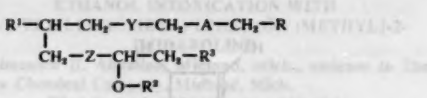
Edward J. Cragoe, Jr., and John B. Bicking, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 502,126, Aug. 30, 1974, abandoned. This application June 18, 1975, Ser. No. 587,924

Int. Cl.² C07C *65/02*

U.S. Cl. 260—399 16 Claims

1. A compound of the formula



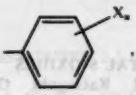
wherein

R is selected from the group consisting of carboxy and a carboxy salt;

R^1 is selected from the group consisting of acetyl, propionyl, 1-hydroxyethyl, 1-hydroxypropyl, and hydroxymethyl;

R^2 is hydrogen;

R^3 is O—R^6 or S—R^6 wherein R^6 is phenyl, substituted phenyl,



where X is halogen, trifluoromethyl, lower alkyl, lower akoxy, dimethylamino, nitro, mesyl, lower alkanoyl, attached *o*, *m*, or *p*, and *n* is 1 or 2;

A is methylene (—CH_2—);

Y is ethylene; and

Z is ethylene.

4,020,178
1,4-DIHYDROPYRIDINE ESTERS USED AS CORONARY DILATORS AND ANTI-HYPERTENSIVES

Friedrich Bossert, Wuppertal; Egbert Wehinger, Neviges; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

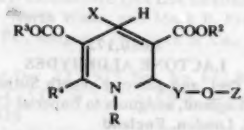
Division of Ser. No. 485,300, July 2, 1974, abandoned. This application June 11, 1975, Ser. No. 585,963

Claims priority, application Germany, July 12, 1973, 2335466

Int. Cl.² A61K *31/455*

U.S. Cl. 424—266 22 Claims

1. A pharmaceutical composition for achieving coronary dilating and anti-hypertensive effects which comprises an effective amount of a compound selected from the group consisting of a dihydropyridine of the formula:



and the pharmaceutically acceptable nontoxic salts thereof, wherein

Y is alkylene of 1 to 4 carbon atoms;

Z is alkyl of 1 to 4 carbon atoms;

R is hydrogen, alkyl of 1 to 4 carbon atoms, or alkenyl of 2 to 4 carbon atoms;

each of R^2 and R^3, independent of the other, is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms or cycloalkyl of 3 to 10 carbon atoms;

R^4 is hydrogen, alkyl of 1 to 6 carbon atoms or Z—O—Y wherein Z and Y are as defined above; and

X is phenyl or naphthyl, unsubstituted or substituted by one or two members independently selected from the group consisting of halo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, trifluoromethyl, cyano, nitro, azido, phenyl, hydroxy, amino, alkylamino of 1 to 4 carbon atoms, dialkylamino of 1 to 4 carbon atoms in each alkyl

group, carbalkoxy of 1 to 4 carbon atoms in the alkoxy moiety, acetamido, propionamido, acetoxy, propionyloxy, methyl.S(O)$_m$ or ethyl-S(O)$_m$ in which m is 0, 1 or 2, in admixture with a pharmaceutically acceptable carrier.

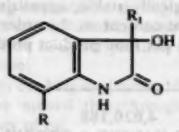
4,020,179

7-SUBSTITUTED-2-INDOLINONES

John L. Irvine, West Allis, Wis., assignor to Richardson-Merrell Inc., Wilton, Conn.

Filed May 15, 1975, Ser. No. 577,631
Int. Cl.² A61K 31/40; C07D 209/38
U.S. Cl. 424—274 **10 Claims**

1. A compound of the formula



I

in which R is chloro, bromo, fluoro or trifluoromethyl, and R_1 is lower alkyl of 1 to 4 carbon atoms, phenyl, benzyl, phenethyl, chlorobenzyl, chlorophenyl, methoxyphenyl or dichlorophenyl, or pharmaceutically acceptable salts thereof.

10. The method of controlling convulsions in animals which comprises administering to an animal susceptible to such convulsions a safe and effective anticonvulsant amount of a compound of claim 1.

4,020,180

NONCORROSIVE CUPRAMMONIA FUNGICIDE AND METHOD FOR USING SAME

Hans Woerner, Mount Pleasant, N.C., assignor to Mineral Research & Development Corporation, Charlotte, N.C.

Continuation-in-part of Ser. No. 223,702, Feb. 4, 1972, Pat. No. 3,900,504. This application Aug. 11, 1975, Ser. No. 603,355
Int. Cl.² A01N 9/00
U.S. Cl. 424—294 **8 Claims**

1. A substantially noncorrosive aqueous concentrate solution which is dilutable with water to a fungicide composition comprising an aqueous cuprammonium lower carboxylate complex of copper lower carboxylate and ammonium lower carboxylate in weight proportions of about 13 parts of copper lower carboxylate as measured as the dihydrate to about 2 parts of ammonium lower carboxylate, and about 10 parts of 29 percent aqueous ammonia, said solution being at a pH in the range of about 7.1 to 7.4.

4,020,181

METHOD OF REPELLING INSECTS FROM DOMESTIC MAMMALS

Gerald Gordon Blackman, and Michael Derek Matthewson, both of Berkhamsted, England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed May 7, 1975, Ser. No. 575,195
Claims priority, application United Kingdom, May 8, 1974, 20224/74
Int. Cl.² A61K 31/215
U.S. Cl. 424—305 **15 Claims**

1. A method of repelling insects of the order Diptera from a domestic mammal which comprises depositing on said mammal a non-toxic effective Diptera insect repellent amount of a compound, 3-phenoxybenzyl-2,2-dimethyl-3-(2,2-dichlorovinyl) cyclopropane-1-carboxylate or of a formulation comprising said compound in intimate admixture with a carrier or diluent therefor.

4,020,182

PESTICIDAL FORMALDEHYDE CONCENTRATE

Leo E. Burt, Robbinsville, N.C., and Stephen E. Frazier, Orlando, Fla., assignors to Leo E. Burt, Robbinville, N.C.

Continuation-in-part of Ser. No. 349,796, April 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 187,900, Oct. 8, 1971, abandoned. This application Nov. 21, 1974, Ser. No. 525,830
Int. Cl.² A01N 9/20, 9/24; C05C 9/00
U.S. Cl. 424—327 **2 Claims**

1. A concentrated pesticidal composition for use upon dilution with water on foliage of growing plants, around roots, on grass, and in the surrounding soil, said diluted composition being non-phytotoxic, anti-fungal, anti-bacterial, anti-nematode, and also effective against certain small insects such as mites, flies, scale insects, caterpillars, and aphids, said concentrated composition comprising in aqueous solution 30–50 parts by weight formaldehyde; 0.5–3.5 parts by weight of a hydrazinium salt selected from the group consisting of 1,1-dimethylhydrazine oxalate, hydrazine monohydrochloride, and methylhydrazine sulfate; and 0.5–3.5 parts by weight of an ammonium salt selected from the group consisting of ammonium benzoate and ammonium citrate.

4,020,183

NONIONIC SURFACE ACTIVE ANTI-HERPES SIMPLEX VIRAL AGENTS

Samuel Simon Asculai, St. Louis, Mo.; Alfred B. Kupferberg, deceased, late of Somerville, N.J.; by Beatrice Kupferberg, coexecutrix, Somerville, N.J., and by Meyer Halpern, coexecutor, Lauderhill, Fla., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Dec. 3, 1974, Ser. No. 529,180
Int. Cl.² A61K 31/09
U.S. Cl. 424—341 **6 Claims**

1. A method of inactivating herpes simplex virus infectivity in humans which comprises applying to the affected area an effective amount for treating herpes simplex virus of a nonionic surfactant in a pharmaceutically acceptable carrier, said nonionic surfactant having at least one ether linkage.

4,020,184

METHOD OF MAKING PIZZA BREAD ANALOG

Jack B. Chesner, 2747 Alice Terrace, Union, N.J. 07083

Filed Jan. 2, 1976, Ser. No. 646,348
Int. Cl.² A21D 8/04
U.S. Cl. 426—19 **7 Claims**

1. A method for making a pizza flavored food product in the form of a bread analog comprising the steps of preparing a dough having a homogeneously distributed mixture of a tomato based formulation of flavoring ingredients, allowing the dough to ferment, releasing the gases formed during said fermentation, scaling the dough into desired shapes, proofing the dough, providing an incision penetrating an upper surface and extending interiorly into the dough, placing a liquefied charge of stabilized flavor intensifier into the incision, baking the dough in an oven for partial sealing of the incision and limited migration of the flavor intensifier to provide an included area having a soft moist texture, removing the dough from the oven prior to completion of the baking procedure, applying a flowable cheese sauce composition to the upper surface of the dough, reinserting the dough into the oven to complete the baking procedure wherein the sauce composition sets to form a surface lamina.

4,020,185
STARTER CULTURE MEDIA CONTAINING WHEY

Delmar Lloyd Andersen, Syracuse; Louis Russell Boston, Chiltenanga, and William H. Seleen, De Witt, all of N.Y., assignors to Borden, Inc., Columbus, Ohio

Division of Ser. No. 259,862, June 5, 1972, Pat. No. 3,852,158. This application Apr. 29, 1974, Ser. No. 464,758

Int. Cl.² A23C *19/02, 21/00*

U.S. Cl. 426—36 **6 Claims**

1. Process for preparing cheese from milk comprising adding to the milk an effective amount of a starter culture to coagulate the milk by fermentation, the starter culture is prepared from ingredients consisting essentially of A, B, and C in amounts specified below, or about 100 parts basis, by making a solution of ingredients A and B and then inoculating the solution with ingredient C and incubating the inoculated solution to produce the starter culture:

A. from 1 to 20 parts of dry culture medium consisting essentially of ingredients (a), (b) and (c) in amounts specified below on a 100 parts dry basis:

a. from 0.5 to 10 parts of a nitrogen source selected from the group consisting of yeast extract, yeast autolysate, solubilized yeast and food yeast,

b. from 1 to 30 parts of a citrate source selected from the group consisting of citric acid and salts of citric acid, amount of the citrate source being based on citrate anion exclusive of cation weight, and

c. from 70 to 95 parts of a milk product to provide 100 parts of the culture medium on dry basis consisting essentially of a major amount of undecalcified sweet whey and a minor amount of undecalcified nonfat dry milk;

B. from 80 to 99 parts of water; and

C. an effective amount of a lactic acid producing bacteria to inoculate the solution of A and B to cause growth of the bacteria to flourish.

4,020,186
METHOD FOR MANUFACTURE OF RICOTTA CHEESE

John L. Edwards, Wildwood, Ill., assignor to Kraftco Corporation, Glenview, Ill.

Filed Dec. 16, 1974, Ser. No. 532,837

Int. Cl.² A23C *19/00*

U.S. Cl. 426—36 **5 Claims**

1. A method for the manufacture of Ricotta cheese which reduces the amounts of fat lost in the process, comprising introducing skim milk into a setting tank, adding an acidulant to the skim milk at a level sufficient to establish a pH of from about 5.6 to about 6.4, heating the acidulated skim milk to a temperature of from about 170° to about 190° F. to set the skim milk to provide a mixture of curd and whey, separating the curd from the whey, adding cream to said curd at a level sufficient to provide a finished Ricotta cheese product containing from about 2.0 percent to about 16 percent by weight fat and comminuting the mixture of curd and cream to reduce the curd particle size.

4,020,187
METHOD OF PRODUCING DRY PET FOOD

Michael G. McCulloch, Topeka, and Woodrow E. Nelson, Berryton, both of Kans., assignors to Theracon, Inc., Topeka, Kans.

Filed Dec. 9, 1974, Ser. No. 530,929

Int. Cl.² A23L *1/30, 3/34*

U.S. Cl. 426—72 **3 Claims**

1. The process of manufacturing an expanded animal food product comprising:

1. grinding a quantity of meat and meat by-products;
2. adding water and fat to product a meat slurry of over 25% fat content;
3. heating said mixture to a temperature sufficient to liquefy said fat;
4. homogenizing said heated mixture to reduce particle size and distribute fat content uniformly through the mixture;
5. preparing a dried ground mix of cereals and appropriate vitamins, minerals, and preservatives;
6. combining the heated meat slurry and the dry mix in such proportions that (involving from 30% to 50% of) the meat slurry represents 25% to 50% of the mixture by weight, and mixing same in a blender;
7. extrusion cooking the mixture at temperatures from 225° to 325° F. and pressures in excess of 50 p.s.i. and extruding the cooked material to atmospheric conditions through a die at a temperature in excess of 225° F., thereby expanding the cooked product by flashing of contained water to steam; and
8. heating the expanded product to remove only water to attain a moisture content of 7% to 15%, thereby producing a micro-biologically stable, appetizing animal food with a minimum fat content on the order of 7.5%.

3. A dried expanded pet food product produced in accordance with claim 1.

4,020,188
COOKED DOUGH HAVING A FROZEN DESSERT FILLING AND METHOD THEREFOR

John H. Forkner, 2116 Mayfair Drive West, Fresno, Calif. 93703

Filed Nov. 28, 1975, Ser. No. 636,134

Int. Cl.² A21D *13/08;* **A23G** *9/04*

U.S. Cl. 426—95 **16 Claims**

1. A method for the manufacture of food products having an inner filler of frozen dessert and an outer layer of cooked dough, comprising forming a composite sheet consisting of a layer of uncooked farinaceous dough and a continuous layer of protective backing material applied to one surface of the dough, applying the composite sheet about the exterior surfaces of an edible frozen filling, with the backing layer adjacent the filling and between the filling and the layer of uncooked dough, subjecting the product to a cooking cycle whereby the dough layer is heated and cooked, the backing layer during the cooking cycle serving to protect the filling against undue heating and to inhibit infusion of filling material into the dough, the temperature and time factors of the cooking cycle being controlled to complete cooking of the dough layer without substantial cooking of the backing layer.

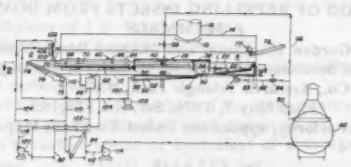
4,020,189
PROCESS FOR DEEP-FAT COOKING

Edward S. Wright, Pittsburgh, Pa.; John W. Angstadt, Williamsville, and Gerald L. Garrow, Buffalo, both of N.Y., assignors to Blaw-Knox Food and Chemical Equipment, Inc., Buffalo, N.Y.

Continuation of Ser. No. 363,379, May 24, 1973, abandoned, which is a division of Ser. No. 108,303, Jan. 21, 1971, Pat. No. 3,754,468. This application July 2, 1975, Ser. No. 592,365

Int. Cl.² A23L *1/10*

U.S. Cl. 426—438 **4 Claims**



1. In a continuous process for cooking comestibles in cooking oil in an elongated cooking area defined by an entry end, an exit end, and a horizontally elongated body of heated cooking oil continuously flowing horizontally from adjacent said entry end to said exit end, and having a separate source of heated cooking oil, the steps which comprise

a. segregating said body into first and second cooking zones by an area of restricted horizontal flow;
b. continuously flowing heated cooking oil from said source upwardly at a plurality of spaced points dispersed over the entire bottom surface of said first cooking zone to effect a generally vertical upward flow of cooking oil over the entire said first cooking zone;
c. simultaneously with said flowing step, continuously introducing comestibles into said first zone, said comestibles falling through said upwardly moving oil from said flowing step;
d. comingling said cooking oil and said comestibles in said first zone for the cooking thereof and causing moisture removal therefrom, whereby said comestibles become buoyant in said cooking oil;
e. continuously moving horizontally said partially cooked now floating comestibles through said area of restricted flow to said second cooking zone by hydraulic action of horizontal flow of upper portions of said body of oil from said first zone;
f. continuously cooking said comestibles in said second zone as they are moved therethrough by said horizontally moving body of oil;
g. continuously removing said comestibles from said exit end; and
h. continuously withdrawing cooking oil from said exit end for the recycling thereof to said source.

4,020,190

CHEESE FLAVOR CONTAINING ALKYL AMINES AND PROCESS OF FLAVORING

Karl Heinz Ney, Hamburg; I. Poetoe Gde Wirotama, Rellingen, and Wolfram Gustav Freytag, Halstenbek, all of Germany, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 407,701, Oct. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 240,816, April 3, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 530,894

Claims priority, application Luxembourg, Apr. 8, 1971, 62955; Apr. 8, 1971, 69954

Int. Cl.² A23L *1/226*

U.S. Cl. 426—534 **4 Claims**

1. A ripe Cheddar cheese flavoring composition consisting essentially of:
i. from 0.1 to 1 part by weight of alkyl amines having from 3 to 5 carbon atoms or equivalent amounts of salts thereof; and
ii. from 60 to 95 parts by weight of alkanoic acids having from 2 to 10 carbon atoms containing from 40 to 60% by weight of hexanoic acid, not more than 40% by weight of alkanoic acids having from 7 to 10 carbon atoms, and not more than 4% by weight of branched chain alkanoic acids having 4 or 5 carbon atoms; and
iii. from 0.4 to 6 parts by weight of alkanones having from 5 to 13 carbon atoms;
iv. from 0 to 35 parts by weight of 2-oxoalkanoic acids having from 2 to 6 carbon atoms and 2-oxoalkanedioic acids having 4 or 5 carbon atoms;
v. from 0 to 2 parts by weight of aldehydes having from 2 to 10 carbon atoms;
vi. from 0 to 0.1 parts by weight of methyl and ethyl esters of alkanoic acids having from 4 to 10 carbon atoms, and
vii. from 0 to 0.01 parts by weight of methional.

4,020,191

METHOD FOR FORMING FLAT DISPLAY PANEL PHOSPHOR DOTS

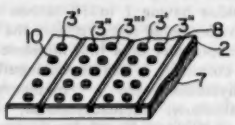
Waichi Nagashiro; Tadao Okabe; Atsushi Sumioka, all of Hachioji, and Mitsuru Oikawa, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 10, 1975, Ser. No. 611,985

Claims priority, application Japan, Sept. 13, 1974, 49-104989

Int. Cl.² B05D *3/06*

U.S. Cl. 427—12 **13 Claims**



1. A method of forming a flat display panel having phosphor dots comprising the steps of:
a. applying a paste layer containing a phosphor, photoresist material and powdered glass onto the areas of a dielectric layer by means of a printing procedure, said areas covering at least the predetermined portions of said dielectric layer on which the phosphor dots are to be formed, and being broader than said portions;
b. placing a mask having the beam apertures on the paste layer on said dielectric layer;
c. irradiating light onto said paste layer through said beam apertures of the mask to harden the areas of said paste layer coated on said predetermined portions of said dielectric layer;
d. developing said paste layer so as to remove the nonhardened areas of said paste layer;
e. heating the hardened portions of the paste layer at a first temperature of from 250° to 450° C. to decompose and thereby to remove organic materials contained in said paste layer;
f. then heating said paste layer at a second temperature higher than the first temperature to fuse said glass powder contained in said paste layer, said second temperature ranging from 450° to 550° C.

4,020,192

XEROGRAPHIC REPRODUCTION PROCESS AND TONER CARRIER FOR USE THEREWITH

Toll Nozaki, Minami-ashigara, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

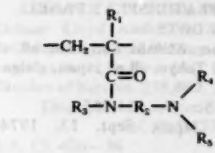
Filed Sept. 9, 1974, Ser. No. 504,387

Claims priority, application Japan, Sept. 10, 1973, 48-101085

Int. Cl.² B05D *1/06;* **G03G** *13/06*

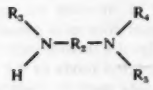
U.S. Cl. 427—19 **17 Claims**

1. A xerographic reproduction process comprising the steps of
forming an electrostatic latent image on a recording layer and
developing the image with a developer comprising a toner and a carrier, the carrier comprising a core coated with an organic polymer coating containing about 0.01% by weight to 100% by weight of a monomer unit having the following formula

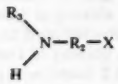


where R_1, R_3, R_4 and R_5 are each a hydrogen atom or a hydrocarbon residue having 1 to 12 carbon atoms and R_2 is a hydrocarbon residue having 1 to 12 carbon atoms, said organic polymer coating being selected from the group consisting of

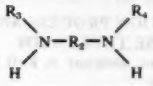
1. a homopolymer of a first monomer selected from the group consisting of dimethylaminoethyl methacrylamide, dimethylaminopropyl methacrylamide, dimethylaminobutyl methacrylamide, dimethylaminohexyl methacrylamide, dimethylaminodecyl methacrylamide, diethylaminoethyl methacrylamide, diethylaminobutyl methacrylamide, dipropylaminoethyl methacrylamide, dibutylaminoethyl methacrylamide, dimethylaminoethyl acrylamide, dimethylaminopropyl acrylamide, dimethylaminobutyl acrylamide, dimethylaminohexyl acrylamide, dimethylaminodecyl acrylamide, diethylaminoethyl acrylamide, diethylaminobutyl acrylamide, dipropylaminoethyl acrylamide and dibutylaminoethyl acrylamide;
2. a copolymer of (a) said first monomer and (b) a second monomer selected from the group consisting of alkyl acrylate, alkyl methacrylate, cycloalkyl acrylate, cycloalkyl methacrylate, hydroxyalkyl acrylate, hydroxyalkyl methacrylate, acrylamide, methacrylamide, alkylol acrylamide, alkylol methacrylamide, acrylonitrile, methacrylonitrile, styrene, vinyltoluene, vinyl acetate and vinyl chloride; and
3. a polymer formed by reacting with a starting polymer selected from the group consisting of polymethacrylic acid, polymethyl methacrylate, polyethyl methacrylate, polypropyl methacrylate, polybutyl methacrylate, polyacrylic acid, polymethyl acrylate, polyethyl acrylate, polypropyl acrylate and polybutyl acrylate and copolymers and terpolymers thereof, a reagent selected from the group consisting of compounds having the following formula



(a)

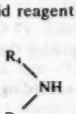


(b)



(c)

where a first further reagent having the following formula is reacted with said starting polymer subsequent to the reaction of said reagent having the above formula (b):



(d)

where a second further reagent having the following formula is reacted with said starting polymer subsequent to the reaction of said reagent having the above formula (c):

and where R_2, R_3, R_4 and R_5 are as defined hereinbefore and X is a halogen atom.

4,020,193

METHOD OF FORMING A NON-GLOSSY FILM

Marco Wismer, Gibsonia, and Earl E. Parker, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 135,797, April 20, 1971, abandoned. This application July 10, 1973, Ser. No. 377,992

Int. Cl.² C08F 8/00; C08L 67/06

U.S. Cl. 427—54 **8 Claims**

1. The method of preparing a cured, non-glossy film comprising

A. applying to a substrate a layer of a composition consisting essentially of

1. a polyester resin comprising
   a. from about 40 percent to about 90 percent by weight of unsaturated polyester prepared from an alpha,-beta-ethylenically unsaturated polycarboxylic acid and polyhydric alcohol; and
   b. from about 10 percent to about 60 percent by weight of copolymerizable ethylenically unsaturated monomer;
2. at least about 5 percent by weight of ultraviolet-absorbing pigment; and
3. a peroxide catalyst selected from the group consisting of organic peroxides, organic hydroperoxides and esters thereof; and

B. curing said layer by subjecting it to actinic light.

4,020,194

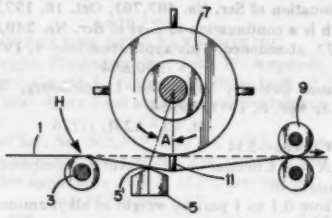
PROCESS FOR DISCONTINUOUS COATING OF A WEB BY PERIODIC DEFLECTION THEREOF AGAINST A FLUID COATING

Donald B. McIntyre, and Frederic S. McIntyre, both of Wellesley Hills, Mass., assignors to Acumeter Laboratories, Inc., Newton Lower, Mass.

Filed Dec. 30, 1974, Ser. No. 537,064

Int. Cl.² B05D 1/18, 5/00

U.S. Cl. 427—172 **5 Claims**



1. A process of fluid application, that comprises, moving a sheet under tension at a predetermined speed longitudinally along a predetermined substantially straight path and past a predetermined stationary line transverse to the longitudinal movement of said sheet and spaced from said path at one side of said sheet; rotating a projection about an axis spaced from and transverse to said path at the opposite side of said sheet, said axis being displaced the direction of sheet movement from training said transverse line, with the direction of rotation selected so that said projection moves in the direction of sheet movement in the vicinity of said line; periodically forcing the rotating projection against said opposite side of the sheet in the vicinity of said transverse line and deflecting said sheet from said path substantially to said transverse line; producing along said transverse line globules of fluid to be deposited on said sheet as coatings; timing such globule production

to occur at substantially the time of and between periodic deflection of the sheet; adjusting the size of the globules to be sufficient to contact the sheet on its said one side along said transverse line when the sheet is deflected in order to cause the deflected sheet to wipe off the globules as coatings thereon selecting the said displacement of the rotational axis so as to determine the dwell time of the deflected sheet upon the globules produced at said transverse line.

4,020,195

METHOD FOR ENAMELLING THE EDGES OF SANITARY ARTICLES

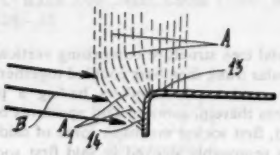
André Primault, Garches, France, assignor to Societe Generale de Fonderie, Paris, France

Continuation-in-part of Ser. No. 361,608, May 18, 1975, Pat. No. 3,904,128. This application May 30, 1975, Ser. No. 582,239

Claims priority, application France, June 27, 1972, 72.23187

Int. Cl.² B05D *3/02, 1/34*

U.S. Cl. 427—193 **3 Claims**



1. A method of enamelling the edges of sanitary articles such as baths, in which enamel powder is deposited in a solid state on the article which has previously been heated to a temperature above the melting temperature of the enamel, said edges having a top surface and a lateral surface, wherein a flux of solid enamel powder is caused to fall from a dusting unit onto the edge to be enamelled and also to project outwards therefrom with respect to the vertical line of extension of the lateral surface of the edge, and wherein the projecting portion of said flux is turned towards the lateral surface by blowing thereto a jet of gas which is directed transversely towards said lateral surface and passes in the vicinity of the vertical center line of the enamel flux from the dusting unit and below the latter so as to substantially intersect said flux.

4,020,196

PROCESS FOR TREATING FILAMENTARY PRODUCTS

René Guillermin, Bron; Jean Joly, Craponne, and Sylvio Sangalli, Caluire, all of France, assignors to Rhone-Poulenc-Textile, Paris, France

Filed June 5, 1975, Ser. No. 583,914

Claims priority, application France, June 10, 1974, 74.20253

Int. Cl.² D06B *3/06;* **B05D** *1/18*

U.S. Cl. 427—248 G **5 Claims**

1. A process for treating at least one moving textile yarn in a treatment zone including surfaces which define at least one groove wherein the groove is pierced with at least one orifice, through which a treatment fluid is introduced, and wherein the improvement resides in the simultaneous steps of advancing the yarn through the treatment zone, while treating the yarn with the fluid and suspending the yarn in the fluid so that the yarn does not engage the surfaces defining the groove.

4,020,197

PROCESS FOR THE CATALYTIC SENSITIZATION OF NON-METALLIC SURFACES FOR SUBSEQUENT ELECTROLESS METALLIZATION

Horst Steffen, Geldern, Germany, assignor to Kollmorgen Technologies Corporation, Dallas, Tex.

Filed Feb. 5, 1975, Ser. No. 547,360

Claims priority, application Germany, Feb. 22, 1974, 2409251

Int. Cl.² C23C *3/02*

U.S. Cl. 427—304 **19 Claims**

1. A process for the formation of catalytic nuclei on a surface to be metallized comprising:

i. treating said surface with a sensitizing solution comprising a copper (I) ion compound capable of forming ionic solutions including such solutions of a complex compound and a solvent therefor, the compound and/or its hydrolysis products having a solubility product so low that they are sparingly soluble or insoluble in water;

ii. subsequently rinsing the excess solution from the so-treated surface with water, whereby the copper compound is hydrolyzed and anchored firmly to the surface; and thereafter

iii. exposing the surface to a solution containing a reducing agent or agents to form active nuclei for electroless metal deposition by reduction of said copper (I) compound.

4,020,198

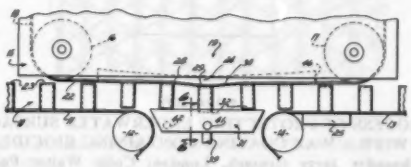
PREVENTING FORMATION OF EXCESSIVE BEAD OF COATING MATERIAL ON METAL CAN RIMS

James W. Cornelius, and Robert T. Mallon, both of Cincinnati, Ohio, assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed July 28, 1976, Ser. No. 709,504

Int. Cl.² B05D *5/00*

U.S. Cl. 427—336 **5 Claims**



1. In a process for applying a surface coating to a can wherein a free-flowing hardenable coating material is applied to an inverted metal can and thereafter drains downwardly toward the lower edge of the can and tends to form a bead thereon,

the method of eliminating an excessively thick bead of the coating material on the lower edge of said can, said method comprising,

holding the can so that it hangs suspended while said material is collecting at said edge to form a bead,

before the bead has hardened, moving the can thus suspended along a path such that only the lower edge of the can, at which the bead is forming, is dipped below the surface of a bath containing a pool of thinner for the coating material, for a period of time sufficient that the thinner substantially removes the unhardened bead of coating material,

removing the can from the bath,

maintaining the can in inverted position until unhardened coating material remaining on the can above said edge drains onto said edge and recoats the same but not excessively,

and then hardening said coating material.

4,020,199

PROCESS FOR PRODUCING ACRYLIC FIBERS HAVING ANIMAL HAIR-LIKE HAND

Katsuaki Nomura, and Masaaki Fujimatsu, both of Okayama, Japan, assignors to Japan Exlan Company Limited, Japan

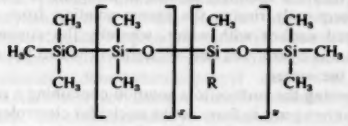
Continuation of Ser. No. 415,400, Nov. 13, 1973, abandoned. This application Sept. 24, 1975, Ser. No. 616,311

Claims priority, application Japan, Nov. 14, 1972, 47-114132

Int. Cl.² B32B 27/30; C08J 7/04

U.S. Cl. 427—334 1 Claim

1. A process for preparing acrylic fibers having an animal hairlike hand which comprises preparing an emulsion of pH 5.5 to 6.8 consisting essentially of (1) a silicone resin of the formula



wherein R is $R'NH_2$, $R'NHR''$ or $R'NR''_2$, R' is $+CH_2+_n$, n is 1 to 3, R'' is C_mH_{2m+1}, m is 1 to 3, x and y are positive integers and the molecular weight of the silicone resin is less than 100,000 and (2) an emulsifier selected from the group consisting of polyoxyethylene (n') monoalkylphenyl phosphates, wherein n' is the number of ethylene oxide groups and is a value of 5 to 15, and the alkyl group contains 8 to 12 carbon atoms, and (3) water, depositing said emulsion on undried wet-spun swollen gelly acrylic fibers containing 40 to 100% by weight of water based on the dry weight of the fibers, in an amount of 0.1 to 3.0% by weight of the silicone resin based on the dry weight of the fibers, immediately drying the resultant fibers to fix said silicone resin on the fiber surfaces and applying a spinning oil agent to the dried fibers.

4,020,200

PROCESS OF PROTECTING UNDERWATER SURFACES WITH A WAX COATING CONTAINING BIOCIDES

Aleksander Jerzy Groszek, London; Colin Walter Parkes, Peachey near Uxbridge, and Ronald Alfred Crump, Horsham, all of England, assignors to The British Petroleum Company Limited, London, England

Filed Mar. 7, 1975, Ser. No. 556,307

Claims priority, application United Kingdom, Mar. 13, 1974, 11186/74; Mar. 13, 1974, 11187/74; June 6, 1974, 25084/74

Int. Cl.² C09D 5/14; B05D 7/00; B32B 9/04

U.S. Cl. 427—416 2 Claims

1. A process for protecting an underwater surface against weed and/or shell growth comprising applying to said underwater surface to a thickness of from 5 to 500 micrometers a coating composition consisting essentially of a wax which is a film-forming component and in a major amount of the total amount of the total components of the coating composition, the coating also containing at least one biocide effective against weed and/or shell growing, said biocide being a polymeric material selected from polyionenes and metal salts of a polyacrylic acid having an average molecular weight of from 200 to 500,000, said metal being selected from the group consisting of copper, zinc, nickel, cobalt and tin, the total biocide component being in a minor amount of the total components of the coating composition, the biocide amount being from 1 to 70% by weight of the amount of wax.

4,020,201

ARTIFICIAL TREE

Jeanne Marylyn Miller, 3221 W. Colorado Ave., Colorado Springs, Colo. 80904

Filed Feb. 11, 1976, Ser. No. 657,042

Int. Cl.² A47G 33/06

U.S. Cl. 428—8 5 Claims

1. An artificial tree structure comprising vertically extending hollow tubular trunk members coupled together, a base for said members, said trunk members having a plurality of spaced apertures therein, some of said apertures being oppositely arranged, first socket means in some of said apertures, limb members removably sleeved in said first socket means said first socket means is tubular and flexible and formed with spaced annular flanges thereon for flexibly engaging the periphery of some of said apertures, second electrical socket means having a flat base arranged in others of said apertures, spring clip means having a bowed inwardly extending base portion in apertures opposite those having said second socket means therein and said bowed base engaging and pressing against said flat base for retaining said second socket means in said trunk members, said bowed portion terminates in outwardly and oppositely bent ends for engaging the periphery of said apertures, main double conductor wires extending within said trunk members and connected to said second socket means and to a source of current, double strings of light sockets with bulbs therein and having a male plug thereon, said plugs being adapted to be connected to at least some of said second socket means and arranged on limbs adjacent to said second socket means.

4,020,202

BEAM AND STRUT GIRDER

Holger Kreft, Karlsfeld, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg AG, Germany

Filed July 8, 1974, Ser. No. 486,349

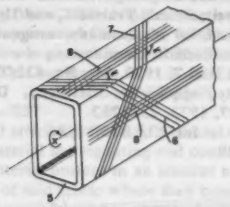
Claims priority, application Germany, July 7, 1973, 2334645

Int. Cl.² B32B 9/00

U.S. Cl. 428—33 14 Claims

1. A beam and strut girder for application in vehicles and civil engineering, which comprises a girder structure having a longitudinal centerline and consisting of reinforcing fibers made of carbon or boron embedded within a plastic matrix; said reinforcing fibers being embedded in the plastic matrix at an angle of 30° to 60° with said longitudinal centerline and

said girder structure being formed of at least one shaped section comprising a fraction of a hollow shaped body, said

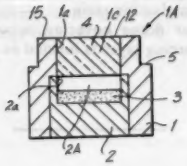


body having windings of said reinforcing fibers positioned within said plastic matrix.

4,020,203
LUMINOUS MARKING IN AN INDENTATION OF AN OBJECT

Oscar Thuler, Freiburgstrasse 624, 3172 Niederwangen, Berne, Switzerland

Filed Mar. 27, 1975, Ser. No. 562,516
Claims priority, application Switzerland, May 22, 1974, 7056/74; June 15, 1973, 8751/73
Int. Cl.² B32B *3/08, 3/10;* **C09K** *11/00;* **H05B** *33/00*
U.S. Cl. 428—35 **15 Claims**



1. Luminous marking on an object, said object having an indentation therein, comprising a phosphor in said indentation, a source of nuclear radiation in said indentation and an artificial, transparent sapphire crystal shaped to conform to the mouth of said indentation and to form a seal for confining said phosphor and source of nuclear radiation within said indentation and for preventing entry of corrosives or acids from the exterior, the outer surface of said sapphire crystal being essentially flush with the outer surface of said object at said indentation.

4,020,204
VINYL TRANSFER SHEET MATERIAL AND METHOD FOR APPLYING SAME TO VINYL SUBSTRATE

John Sebring Taylor, Newark, Del., and Wilbur Thomas Brader, Media, Pa., assignors to FMC Corporation, Philadelphia, Pa.

Filed Dec. 24, 1975, Ser. No. 644,219
Int. Cl.² E04F *13/20, 15/16*
U.S. Cl. 428—40 **10 Claims**

1. A method of preparing a protected substrate comprising:

(a) contacting a vinyl chloride polymer or copolymer substrate with an/exposed film surface of a transfer sheet material, wherein the transfer sheet material comprises (1) a continuous, flexible, non-fibrous cellulosic carrier and (2) a film of plasticized vinyl chloride and vinyl acetate copolymer resin releasably adhered directly onto one side of the non-fibrous cellulosic carrier, the copolymer resin consisting essentially of about 75% to about 95% vinyl chloride and of about 5% to 25% vinyl acetate, all percentages by weight based on the copolymer resin weight, and from about 5 to 20 parts of plasticizer per hundred parts of copolymer resin;

b. pressing, in the presence of heat, the contacting surfaces of the transfer sheet film and the substrate so as to provide a laminate in which the film is tenaciously bonded to the substrate; and

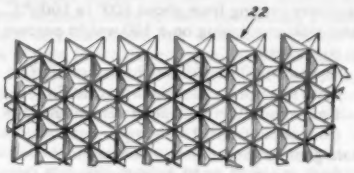
c. thereafter cooling the laminate.

10. A transfer sheet material which comprises a continuous, flexible, non-fibrous cellulosic carrier and (b) a film of plasticized vinyl chloride and vinyl acetate copolymer resin releasably adhered directly onto one side of the non-fibrous cellulosic carrier, the copolymer resin consisting essentially of about 75% to about 95% vinyl chloride and of about 5% to 25% vinyl acetate, all percentages by weight based on the copolymer resin weight, and from about 5 to 20 parts of plasticizer per hundred parts of copolymer resin.

4,020,205
STRUCTURAL CORES

Philip J. Haselbauer, Newport News, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 13, 1975, Ser. No. 587,007
Int. Cl.² B32B *3/12*
U.S. Cl. 428—116 **3 Claims**



1. A structural core medium formed from structural core elements,

each structural core element being a strip formed from a continuous ribbon, the ribbon being in the form of a series of offset sections, each section having bend lines defining the sides of six alternate upright and inverted triangular surfaces having the bend lines as common sides therebetween, the last triangular surface of each section having superimposed thereabove, with a common side therebetween, the first triangular surface of a subsequent section to form the next offset section, the triangular surfaces of each section being angularly disposed relative to each other by bends along the bend lines to form dihedral angles, the common sides between triangular surfaces forming the vertices of the dihedral angles, the triangular surfaces of each offset section forming two terminal and three internal dihedral angles, the terminal angles opening in one direction, the internal dihedral angles opening in the opposite direction, the superimposed triangular surfaces forming a dihedral section-connecting angle opening in the same general direction as the internal dihedral angles, and at least two offset sections thus bent forming said strip, the structural core medium resulting from two similarly bent strips being joined at their common sides to form a row of alternately offset open-faced tetrahedrons.

4,020,206

THICK-FILM CIRCUIT ON A SUBSTRATE WITH THROUGH-CONTACTS BETWEEN CONDUCTOR PATHS ON OPPOSITE SIDES OF THE SUBSTRATE

Martin Beil, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation-in-part of Ser. No. 445,939, Feb. 26, 1974, abandoned. This application May 30, 1975, Ser. No. 582,380

Claims priority, application Germany, Feb. 28, 1973, 2310062

Int. Cl.² B05D 5/12; B32B 3/10

U.S. Cl. 428—137 1 Claim

1. In a thick film circuit structure of the type comprising an electrically insulative ceramic substrate in the form of a flattened structure having a pair of opposed, generally parallel side faces and having at least on through hole extending therethrough from one such face to the other thereof, said substrate having conductor paths deposited upon each of said side faces, at least one such conductor path on each said side face being located in adjacent relationship to the perimeter of such one through hole, the improvement which comprises a conductive path extending through and substantially completely filling such one through hole, said conductive path being formed by the steps of

a. filling substantially completely such one through hole in a ceramic substrate with a paste composition comprising on a 100 weight percent total weight basis

1. from about 48 to 64 weight percent of gold in the form of particles at least about 90 weight percent of which have number average particle sizes not greater than about 10 microns and not more than about 5 weight percent of which are larger than about 25 microns,

2. from about 3 to 9 weight percent of an inorganic binder comprised of a preformed fritted glass in the form of particles having a number average size of less than about 30 microns and characterized by a capacity to sinter when exposed to temperatures ranging from about 800° to 1000° C.,

said glass comprising on a 100 weight percent total glass wight basis

from about 30 to 65 weight percent PbO

from about 8 to 35 weight percent SiO_2

from about 0.5 to 7 weight percent Al_2O_3

from about 0 to 10 weight percent TiO_2

said glass further optionally containing:

from about 10 to 30 weight percent B_2O_3

in combination with

from about 10 to 30 weight percent LiO and

from about 10 to 30 weight percent CdO by replacement of up to about 25 weight percent of each of said PbO and said SiO_2 therewith,

3. from about 15 to 40 weight percent of inorganic refractory particles having a size in the range from about 5 to 8 microns and characterized by a capacity to not melt at temperatures below about 1000° C., said particles being selected from the group consisting of metal carbides, metal oxides, and quartz, and

4. from about 9 to 17 weight percent of at least one organic liquid which is substantially inert as respects said gold, said inorganic binder and said particle,

b. drying the resulting so filled ceramic substrate at a temperature below about 200° C., and

c. heat the so dried ceramic substrate at a temperature in the range of from about 800° to 1000° C., for a time of less than about 1 hour the extract such time and such temperature relationship in any given instance being sufficient to sinter said compositions, thereby to produce said conductive path, said conductive path being comprised of material which has not shrunk substantially compared to said paste composition as so dried.

4,020,207

INTERIOR COVERING WITH REINFORCEMENT

Franz-Werner Alfter, Siegburg; Joachim Becke, Troisdorf; Hans-Ulrich Breitscheidel, Troisdorf, and Herbert Laubenberger, Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed Dec. 7, 1973, Ser. No. 422,725

Claims priority, application Germany, Dec. 7, 1972, 2259862; Apr. 27, 1973, 2321282

Int. Cl.² B32B 3/26

U.S. Cl. 428—138 16 Claims

1. An interior dome covering for automotive vehicles that is insulating and self-supporting, which comprises a molded laminate structure having a contoured configuration with a variable cross-section, and consisting of at least two sheets of crosslinked polyethylene foam permanently bonded together with an intermediate polymer-containing non-foamed reinforcing layer to form a multiple-layered structure; said reinforcing layer being made from a material selected from the group consisting of polyethylene, polypropylene, ethylene-propylene copolymers, vulcanized fiber reinforced rubber, polyvinylchloride, and cellulosic material impregnated with phenolic resin or melamine resin.

14. The interior dome covering according to claim 1, wherein the reinforcing layer is formed as a perforated sheet.

4,020,208

EXTRUDED PLASTIC MESH

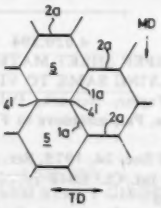
Frank Brian Mercer, and Keith Fraser Martin, both of Blackburn, England, assignors to Netlon Limited, England

Filed Sept. 3, 1975, Ser. No. 609,927

Claims priority, application United Kingdom, Sept. 11, 1974, 39546/74

Int. Cl.² B32B 5/02; D01D 5/12; D02J 1/22; B29D 23/06

U.S. Cl. 428—255 4 Claims



1. An extruded plastic mesh having mesh openings each of which is a six-sided figure bounded on four sides by portions of four separate strands and on oppositely disposed two sides by elongate members comprising confluent portions of pairs of said four strands and forming a crotch at each end of each elongate members, said strands and elongate members having preferred molecular orientation of the plastic material thereof in the direction of their major dimension and passing through and around the crotches of the elongate members of adjacent mesh openings.

4,020,209

COATED FABRICS AND LAMINATED ARTICLES THEREFROM

Edward Lung Yuan, Philadelphia, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 357,774, May 4, 1973, abandoned. This application Apr. 2, 1975, Ser. No. 564,485

Int. Cl.² D03D *13/00*

U.S. Cl. 428—257 10 Claims

1. A coated article comprising: a triaxial woven fabric and a polymeric material impregnating and coating said fabric, said polymeric material present in an amount sufficient to set the yarn courses of said fabric where they cross one another and so that said coated fabric has:

a. a tensile strength, measured at the weakest direction according to ASTM D-1682-64, of at least three times the uncoated fabric;

b. a tensile strength, measured at the weakest direction according to ASTM D-1682-64, of at least 50% of that measured in the transverse direction; and

c. an average tongue tear resistance of the machine and transverse directions measured according to ASTM D-2261-64 of at least twice the tensile strength of an individual yarn used in the woven fabric

wherein the triaxial woven fabric is of fibers selected from the group consisting of glass, polyester, cotton, polyamide and aromatic polyamide and blends thereof;

wherein the polymeric material is selected from the group consisting of an elastomer, an epoxy resin, an acrylic resin, a polyester resin and a perfluorocarbon resin; and

wherein the polymeric material to fabric weight ratio is within the range of about 0.2 to 2.

4,020,210

ENCAPSULATED WATER PAPER

Loren E. Geer, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,603

Int. Cl.² B32B *5/16, 27/14*

U.S. Cl. 428—307 11 Claims

1. In a paper sheet adapted for the electrostatographic reproduction of images on both sides thereof by the deposition on its surface of toner particles in imagewise configuration and fusing the toner into the sheet by the application of heat and pressure thereto, the improvement which comprises a surface size on one or both sides of said sheet, said surface size comprising a binder material and a plurality of microcapsules which comprise a core of water or hydrated salt encased in an impervious capsule wall of a solid material capable of being ruptured by the heat and pressure applied to the sheet during the fusing of the image formed on the first side thereof and in the situation where a hydrated salt is employed as the microcapsule core the salt is selected from those hydrates which give up their water of hydration at a temperature equal to or below that to which the paper is subjected during the fusing operation, said microcapsules being present in an amount which will release sufficient water into the paper sheet so as to provide about two percent water by weight of the paper sheet after the fusing of the image formed on the first side thereof.

4,020,211

ANTI-SKID AND WEAR RESISTANT ROAD SURFACE MARKING MATERIAL

Ludwig Eigenmann, Vacallo, Ticino, Switzerland

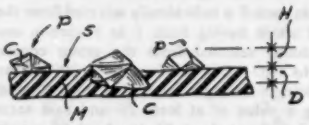
Continuation-in-part of Ser. No. 153,218, June 15, 1971, Pat. No. 3,782,843. This application May 22, 1973, Ser. No. 362,757

Claims priority, application Italy, May 24, 1972, 24785/72

The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.

Int. Cl.² B32B *5/16*; E01F *9/00*

U.S. Cl. 428—323 16 Claims



1. A marker for use on a roadway pavement so as to form a traffic-regulating indicium, comprising a first layer having a first surface adapated to face away from a roadway pavement, said first layer including an elastomeric binder; a second highly light-reflective layer having a second surface adapted fo face away from the roadway pavement and another surface juxtaposed with said first surface, said second layer including a resin of the group consisting of polyamide resins, polyurethane resins and polyterephthalic derivative resins, and said elastomeric binder being selected so as to be compatible with said resin and being a member of the group consisting of elastomeric binders suitable as constituents of traffic-regulating indicia, said second layer being bonded to said first layer over substantially the entire interfacial area between said first and other surfaces by bonds formed due to the compatibility of said resin and binder, and said second surface including spaced first surface sections and subtantially smooth, substantially planar second surface sections constituting a substantial part of said second surface and which are exposed for the reflection of light from said second surface; and a plurality of particles bonded to said second layer and projecting outwardly therefrom at said first surface sections, said particles having a minimum hardness of about 6 on the Mohs Hardness Scale and including pointed end portions outwardly of said second surface for imparting good anti-skid properties to said second layer, and said second layer having a thickness no greater than about the average dimension of said particles and comprising a minimum of about 10 percent by weight of said particles, said particles being securely bonded to said second layer due to the wetting and the resultant intimate contacting of said particles by said resin when said particles are contacted with said resin prior to setting of the latter and due to the nature of said resin which results in the presence of high-strength bonds formed by the attraction of hydrogen atoms for the electrons of the outer electron rings of neighboring oxygen atoms.

4,020,212

POLYOLEFIN FIBERS USEFUL AS FIBERFILL TREATED WITH FINISHING AGENT COMPRISING AN ORGANOPOLYSILOXANE AND A SURFACE ACTIVE SOFTENER

Wayne K. Erickson, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 505,916, Sept. 13, 1974, Pat. No. 3,968,042. This application Apr. 21, 1976, Ser. No. 679,122

Int. Cl.² A47C *27/00*; D06M *13/18, 13/46*

U.S. Cl. 428—361 10 Claims

1. A product comprising polyolefin fiber having deposited thereon a thin coating of a small but effective amount, sufficient to reduce the scrooginess of said fibers, of a finishing agent composition comprising:

on a dry solids basis, from about 60 to about 80 weight percent of a first component and from about 20 to about 40 weight percent of a second component wherein said first component comprises an organopolysiloxane represented by the formula

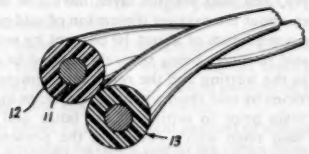
wherein each R is individually selected from the group consisting of alkyls having from 1 to 6 carbon atoms, each X is individually selected from the group consisting of R and $(-CH_2CH_2O-)_cH$ with from 10 to 20% of the X's being R, *b* is an integer having a value of at least 10, and *c* is an integer having a value of at least 20 and said second component comprises from about 86 to about 98 weight percent of a quaternary ammonium salt surface-active material having softening properties for polyolefin fibers; from about 0.3 to about 2 weight percent of a nonionic wetting agent; from about 0.7 to about 4 weight percent of a buffering agent; and from about 1 to about 8 weight percent of a corrosion inhibitor; with the amounts of said components being adjusted within said ranges relative to each other so that when said composition is dispersed in water to provide an aqueous dispersion containing from about 1 to about 20 weight percent solids, said dispersion has a pH within the range of from 6 to 8.

4,020,213

MANUFACTURING AN INSULATED CONDUCTOR AND THE ARTICLE PRODUCED THEREBY

Sven Raymond Berglowe, Jr., Edgewood, and Earl Salvator Sauer, Perry Hall, both of Md., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 20, 1975, Ser. No. 560,068
Int. Cl.² B05D *5/12*
U.S. Cl. 428—379 **6 Claims**



1. A method of covering a electrical conductor conductor with a composition to obtain a controlled adhesion of the composition to the conductor member, which includes the steps of:

advancing the conductor member along a path;

preheating the conductor member to a temperature within a temperature range of approximately 525° F to 650° F; and

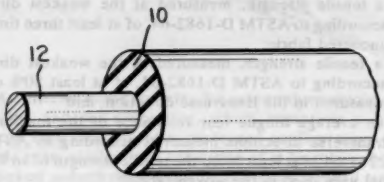
extruding over the conductor member while the temperature thereof is substantially within the specified temperature range an epoxy resin-free composition which consists essentially of a plasticized polyvinyl chloride, a stabilizer, a filler system, a lubricant, and a carbon black constituent, the composition upon being exposed to the specified predetermined temperature range characterized by the release of a reaction product at the interface of the conductor and the composition which treats the outwardly facing surface of the conductor in a manner to cause a controllable adhesion of the composition to the conductor.

4,020,214

METHOD OF MAKING AN INSULATED ELECTRICAL CONDUCTOR USING PRESSURELESS CURING OF FILLED ETHYLENE CONTAINING POLYMERIC COMPOSITIONS, AND AN INSULATED CONDUCTOR FORMED THEREBY

Burton Thornley MacKenzie, Jr., Monroe, Conn., assignor to General Electric Company, New York, N.Y.

Division of Ser. No. 372,084, June 21, 1973, Pat. No. 3,923,731. This application Nov. 28, 1975, Ser. No. 626,246
Int. Cl.² B32B *9/00*, *15/00*; B05D *5/12*; B29F *3/10*
U.S. Cl. 428—389 **8 Claims**



7. An electrical conductor having a relatively dense and substantially non-porous cured polymeric insulation thereon, comprising a conductor and a layer of insulation comprising the cured product in approximate parts by weight of: an ethylene-containing polymer selected from the group consisting of polyethylene, copolymers of ethylene and vinyl acetate, copolymers of ethylene and propylene, and terpolymers of ethylene and propylene with a diene, and mixtures thereof in an amount of 100 parts; at least one mineral filler selected from the group consisting of aluminum silicate, magnesium oxide, titanium dioxide, silica, and glass in amounts of about 15 to 200 parts; tertiary organic peroxide curing agent in an amount of about 0.5 to 10 parts; and, at least one organic titanate selected from the group consisting of tetrakis (2-ethylhexyl) titanate, tetrabutyl titanate, and a mixed alkyl titanate comprising about 85 parts isopropyl C_3 by weight and about 15 parts stearyl C_{18} by weight in an amount of about 2 to 10 parts by weight per 100 parts by weight of the mineral filler.

4,020,215

EXTRUSION OF POLYOLEFIN ONTO PAPER AT DECREASED TEMPERATURES

Lubomir Michaylov, Castro Valley, Calif., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Filed May 30, 1975, Ser. No. 582,340
Int. Cl.² B32B *27/10*, *27/32*, *27/30*
U.S. Cl. 428—420 **14 Claims**

1. A laminate comprising successively

a. a paper substrate coated with a polyalkyleneimine,

b. a layer of a polymer containing functional groups which react chemically with the imino groups of the polyalkyleneimine, the functional groups constituting from about 1 to 25 mole percent of the polymer, and

c. a layer of a polyolefin.

12. In a method of extruding a layer of polyolefin onto a paper substrate coated with a polyalkyleneimine, the improvement of interposing between the coated substrate and the polyolefin layer a layer of a polymer containing 1–25 mole percent functional groups which react chemically with the imino groups of the polyalkyleneimine and extruding the polyolefin layer at a temperature of from about 500° to 580° F.

4,020,216

COATING COMPOSITION FOR FLEXIBLE SUBSTRATES

Lester I. Miller, Troy, Mich., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 3, 1975, Ser. No. 583,453
Int. Cl.² B32B 27/40; C08K 5/05, 1/14
U.S. Cl. 428—425 16 Claims

1. A coating composition comprising 5–60% by weight of a film-forming binder and 40–95% by weight of an organic solvent for the binder; wherein the binder consists essentially of about

A. 20–90% by weight of an acrylic polymer containing hydroxyl groups selected from the group of an acrylic polymer consisting essentially of 20–40% by weight of methyl methacrylate, 40–74% by weight of an alkyl methacrylate having 2–12 carbon atoms in the alkyl group or an alkyl acrylate having 1–12 carbon atoms in the alkyl group, 5–15% by weight of a hydroxy alkyl methacrylate or a hydroxy alkyl acrylate each having 2–4 carbon atoms in the alkyl group and 1–5% by weight of an alkyl amino alkyl methacrylate or an alkyl amino alkyl acrylate and an acrylic polymer consists essentially of 20–44% by weight of methyl methacrylate, 50–70% by weight of an alkyl methacrylate having 6–12 carbon atoms in the alkyl group or an alkyl acrylate having 2–12 carbon atoms in the alkyl group, 5–20% by weight of a hydroxy alkyl acrylate or a hydroxy alkyl methacrylate or a mixture thereof of each having 2–4 carbon atoms in the alkyl group and 1–20% by weight of an α,β ethylenically unsaturated carboxylic acid; wherein the acrylic polymer has a weight average molecular weight of about 5,000–80,000 determined by gel permeation chromatography;

B. 5–40% by weight of a hydroxy terminated ester of a bis primary diol of 2–22 carbon atoms and a hydroxy terminated mono carboxylic acid or a hydroxy terminated polyester of the esterification product of neopentyl glycol and mixed methyl esters of succinic acid, glutaric acid and adipic acid; and

C. 5–75% by weight of an organic aliphatic or cycloaliphatic polyisocyanate;

wherein a dried film of about 2 mils thick of the composition on a flexible hydrocarbon rubber substrate can withstand a 360° mandrel bend test at 5° C. without cracking of the film or loss of adhesion of the film to the substrate.

16. A flexible hydrocarbon rubber or polyvinyl chloride substrate coated with a dried coalesced layer of the composition of claim 1.

4,020,217

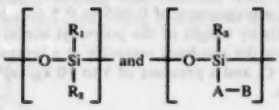
LAMINATED GLASS STRUCTURES AND PROCESS FOR PRODUCTION THEREOF

Isao Karasudani, Kyoto; Toshiyuki Takashima, and Yoshiyuki Bokuda, both of Shiga, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

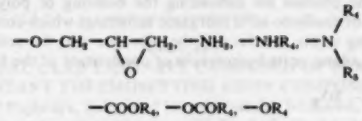
Filed Mar. 7, 1975, Ser. No. 556,414
Claims priority, application Japan, Mar. 9, 1974, 49-27406; Mar. 9, 1974, 49-27407
Int. Cl.² B32B 27/42; C08L 91/00
U.S. Cl. 428—429 25 Claims

1. A laminated glass structure comprising at least two glass sheets bonded to each other through an interlayer of a plasticized polyvinyl acetal resin having a degree of acetalization of 55 to 80 mole %, said polyvinyl acetal resin being treated with a member selected from the group consisting of

a. a modified liquid siloxanes containing 1 to 30 recurring units of each of the formulae



wherein R_1, R_2 and R_3, independently from each other, represent a monovalent hydrocarbon group; A represents an alkylene group containing not more than 20 carbon atoms which is optionally substituted with a hydroxyl group, or an oxyalkylene group containing not more than 250 carbon atoms which is optionally substituted with a hydroxyl group; and B represents

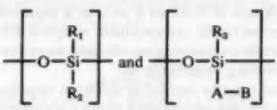


or -OH, in which R_4 and R_5, independently from each other, represent an alkyl group, with the proviso that when B is -OH, A represents the oxyalkylene group, wherein said modified siloxane is used in a proportion of 0.005 to 0.5 part by weight per 100 parts by weight of polyvinyl acetal resin and

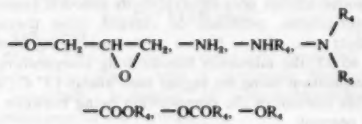
b. a combination of said modified siloxane with at least one alkali metal or alkaline earth metal salt of an organic mono- or dicarboxylic acid.

25. A process for preparing a laminated glass structure, which comprises interposing between at least two glass sheets an interlayer of a plasticized polyvinyl acetal resin having a degree of acetalization of 55 to 80 mole %, said resin being treated with a member selected from the group consisting of

a. a modified liquid siloxane containing 1 to 30 recurring units of each of the formulae



wherein R_1, R_2 and R_3, independently from each other, represent a monovalent hydrocarbon group; A represents an alkylene group containing not more than 20 carbon atoms, which is optionally substituted with a hydroxyl group, or an oxyalkylene group containing not more than 250 carbon atoms which is optionally substituted with a hydroxyl group; and B represents



or —OH, in which R_4 and R_5, independently from each other, represent an alkyl group, with the proviso that when B is —OH, A represents the oxyalkylene group, wherein said modified siloxane is used in a proportion of 0.005 to 0.5 part by weight per 100 parts by weight of polyvinyl acetal resin and

b. a combination of said modified siloxane with at least one alkali metal or alkaline earth metal salt of a organic mono- or dicarboxylic acid wherein said organic monocarboxylic acid is an aliphatic monocarboxylic acid containing not more than 22 carbon atoms and said organic

dicarboxylic acid is an aliphatic dicarboxylic acid containing 4 to 9 carbon atoms and said salt component is used in a proportion of 0.005 to 0.5 part by weight per 100 parts by weight of the polyvinyl acetal resin, and maintaining the resultant assembly at a temperature of 80° to 160° C. and a pressure of 5 to 10 kg/cm² for 10 to 60 minutes.

4,020,218

POLYSULFIDE SEALANT AND CAULK COMPOSITIONS

Maurice W. Ranney, Rockland, and Robert J. Pickwell, Westchester, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Mar. 27, 1975, Ser. No. 562,779

Int. Cl.² B32B *27/06, 9/04;* **B05D** *1/36*

U.S. Cl. 428—447 **7 Claims**

1. The process for enhancing the bonding of polysulfide sealant or caulks to solid inorganic substrates which comprises providing at the interface of the substrate and the sealant or caulk a silane or its hydrolyzate or condensate of the formula

$$R - SiX_3$$

wherein R is a bicyclopentenyl or mercaptonorbornyl containing radical, and X is a hydrolyzable group comprised of chlorine, alkoxy or acetoxy radicals.

4,020,219

METAL DECORATING METHOD INVOLVING MECHANICAL SHAPING

Richard Martorano, Marlton, N.J.; William H. Brendley, Jr., Hatboro, and Thomas H. Haag, Feasterville, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 377,685, July 9, 1973, abandoned, which is a continuation of Ser. No. 130,808, April 2, 1971, abandoned. This application Nov. 27, 1974, Ser. No. 527,791

Int. Cl.² B32B *15/08;* **B21C** *23/22*

U.S. Cl. 428—460 **11 Claims**

7. A shaped sheet metal article containing a cured coating having a thickness of 0.05 to 5 mils of a pigmented or unpigmented thermosettable composition adapted for direct-roller coating of metals comprising an alkaline aqueous blend having a binder consisting essentially of:

A. a latex of a water-insoluble addition copolymer obtained by emulsion polymerization having a molecular weight of from 250,000 to 1,000,000 of (1) a monovinyl aromatic monomer, (2) at least one ester of acrylic or methacrylic acid, (3) at least one olefinically unsaturated monomer having an amide or a hydroxyl group, and (4) an olefinically unsaturated monomer having a carboxyl group, the amount of (3) being from 1.5 to 5 percent and the amount of (4) being from .5 to 2 percent, based on the total weight of monomers, the Tg of the copolymer being below 0° C., and

B. a water-soluble urea-formaldehyde reaction product or a water-soluble methanol or ethanol ether thereof, the weight ratio of A to B on a solids basis being from 35:65 to 65:35, the minimum film-forming temperature of the composition being no higher than about 15° C., and the solids content of the composition being between 40 and 80 percent.

4,020,220

COMPOSITE COATING HAVING ENHANCED CORROSION RESISTANCE

Victor V. Germano, Kirtland, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Mar. 20, 1975, Ser. No. 560,376

Int. Cl.² B05D *7/14, 1/38;* **B32B** *15/04*

U.S. Cl. 428—472 **12 Claims**

1. In the process of protecting a coatable metal substrate with a coating composite, wherein a portion of said coating composite comprises an undercoating and a subsequent coating, each established from heat curable compositions that before curing contain, in liquid medium, a hexavalent-chromium-providing substance which is susceptible to valency reduction to a lower valence state during curing of applied composition, said chromium being at least partially present in said composition in the hexavalent higher valency state, said compositions each further containing reducing agent for said chromium, the improvement in said process for providing extended substrate corrosion resistance protection which comprises:

A. establishing said undercoating in said composite on the surface of said substrate, for providing substrate protection, but in non water-resistant condition;

B. precuring said established undercoating, at elevated temperature, to a dry and water-resistant coating, with the conditions of said elevated temperature precuring being selected to orient the undercoating towards reduction of said chromium in said higher valency state;

C. establishing said subsequent coating of said composite for providing substrate protection, with said subsequent coating being established in non water-resistant condition; and,

D. curing said subsequent coating, at elevated temperature, with the conditions of said elevated temperature curing being selected for first passing said subsequent coating through the conditions of said precuring, thereby initially orienting the chromium of said subsequent coating towards reduction from said higher valency state, and with said elevated temperature conditions, by continuation thereof, then orienting the chromium of said subsequent coating towards a return to said higher valency state.

4,020,221

THIN FILM DEVICE

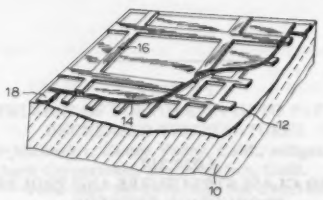
Hideaki Kusakawa; Kenzoo Takahashi, and Shigeki Ikebata, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 455,352, March 27, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,113

Claims priority, application Japan, Mar. 28, 1973, 48-35307

Int. Cl.² B32B *3/00, 3/12*

U.S. Cl. 428—166 **4 Claims**



1. A thin film device for displaying images impressed thereon by a beam of electrons, consisting essentially of a substrate formed of a dielectric material having a light transmitting property, and a single unitary thin metallic film having protrusions as a structural part thereof and on one surface of said thin metallic film, said protrusions being in contact with said dielectric substrate to position said thin metallic film in said spaced superposed relationship therewith, the edges of said film being secured to said substrate.

3. A thin film device for displaying images impressed thereon by a beam of electrons consisting essentially of a substrate formed of a dielectric material having a light transmitting property, electrically conducting protrusions disposed on said dielectric substrate, and a single unitary thin metallic

film having one surface having no protrusions thereon being in contact with said protrusions on said substrate, said film having protrusions as a structural part thereof and on the surface thereof facing away from said substrate, the surface of said thin metallic film having no protrusions being maintained in spaced superposed relationship with said substrate by said protrusions on the substrate, the edges of said film being secured to said substrate.

4,020,222

THIN FILM CIRCUIT

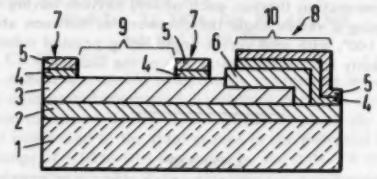
Helmold Kausche, Munich, and Alois Schauer, Gruenwald, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 18, 1975, Ser. No. 587,965

Claims priority, application Germany, June 19, 1974, 2429434

Int. Cl.² B05D *5/12*

U.S. Cl. 428—209 **8 Claims**



1. A thin film circuit comprising a planar substrate of insulating material, supported by said substrate at least one metal film, from which are made by photolithographic techniques the capacitors as well as the resistors, said metal film consisting of an alloy of aluminum with between 2 and 20 atom per cent tantalum and containing oxygen in an amount sufficient so that the temperature coefficient of the resistors is between −300 and −500 ppm/K in order to compensate the positive TCC of the capacitors with the negative TCR of the resistors in RC-networks.

4,020,223

FLUORINATION OF POLYOLEFIN AND POLYACRYLONITRILE FIBERS

Dale D. Dixon, Kutztown, and Larry J. Hayes, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 434,284, Jan. 17, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,029

Int. Cl.² B32B *27/00;* **D02G** *3/00;* **D04H** *1/58*

U.S. Cl. 428—224 **12 Claims**

1. An oil stain release moisture transporting fiber form comprising a synthetic resin selected from the group consisting of polyolefins and polyacrylonitriles, said fiber form being surface fluorinated from about [4×10^{-7} to 4×10^{-1} mg F/cm²] 1×10^{-6} to 1×10^{-3} mg F/cm² on an after wash basis, said fluorinated fiber form exhibiting a neutralization equivalent of below about [1×10^{6}] 2×10^{5} and an F/COOH ratio no greater than 25.

4,020,224

FLAME RETARDANT METHOD

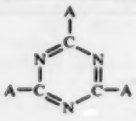
Albert Y. Garner, Yellow Springs, Ohio, assignor to Monsanto Research Corporation, St. Louis, Mo.

Division of Ser. No. 490,607, July 22, 1974. This application Jan. 16, 1976, Ser. No. 649,882

Int. Cl.² C09K *3/28;* **C09D** *5/18*

U.S. Cl. 428—272 **7 Claims**

1. A process for making flame-retardant material from cotton and polyester-cotton having about 30 to 70% by weight cotton comprising treating said material with an aqueous solution of a mixture comprising compounds of the formula



wherein A is NH_2 or $N=P(NH_2)_3$, provided at least one A is $N=P(NH_2)_3$ in sufficient amount and curing the treated material at a sufficient temperature to make the treated and cured material self-extinguishing when subjected to a flame sufficient to ignite and consume the untreated material.

4,020,225

METAL CLAD LAMINATE COMPOSED OF FLAME RESISTANT THERMOSETTING RESIN COMPOSITION

Hiroshi Fujiwara, Soka, and Hiroshi Suzuki, Ichikawa, both of Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Division of Ser. No. 548,108, Feb. 7, 1975. This application Nov. 18, 1975, Ser. No. 633,134

Int. Cl.² B32B *15/12*

U.S. Cl. 428—251 **11 Claims**

1. A metal clad laminate comprising at least one base material impregnated with a flame resistant thermosetting resin and a metal sheet or foil laminated on at least one side of said base material, said thermosetting resin composition comprising:

i. an epoxy resin comprising an epoxy compound having at least two epoxy groups per molecule, and

ii. a halogenated polyhydroxystyrene or a mixture of a halogenated polyhydroxystyrene and polyhydroxystyrene, wherein the halogenated polyhydroxystyrene has a mean degree of polymerization of from about 2 to 10,000 and the equivalent ratio of the number of hydroxyl groups in the halogenated polyhydroxystyrene and polyhydroxystyrene to the number of epoxy groups in the epoxy resin is in the range of 0.3 to 10.

4,020,226

FIBROUS FRICTION MATERIAL

Kuzma Andrianovich Andrianov, Vystavochny pereulok, 3, kv. 9; Georgy Nikolaevich Bagrov, Universitetsky prospekt, 23, korpus 4, kv. 16; Tatyana Vsevolodovna Vasilieva, ulitsa Volgina, 9, korpus 2, kv. 96; Vladimir Alexandrovich Vasjukov, ulitsa Krasnodarskaya, 46, kv. 14; Sergei Ivanovich Lebedev, Schelkovsky proezd, 3, korpus 2, kv. 34; Vladimir Alexandrovich Makarov, ulitsa Sedova, 8, korpus 1, kv. 68, and Lotari Mikhailovich Khananashvili, ulitsa Sumskaya, 6, korpus 2, kv. 244, all of Moscow, U.S.S.R.

Filed Apr. 23, 1975, Ser. No. 570,573

Int. Cl.² F16D *69/02*

U.S. Cl. 428—290 **1 Claim**

1. A fibrous friction material, essentially consisting of carbon fabric; impregnated with a polymeric thermosetting binder, essentially consisting of polyoxyphenylmethanephenoxysiloxanes of the formula

$$[\text{-Si}\{OC_6H_4(CH_2C_6H_3OH)_nCH_2C_6H_4OH\}_2\text{-}]_m,$$

where

$n = 0–2;$

$m = 10–100,$

hexamethylenetetramine, and barium sulfate; said components being present in the following percentages by weight:

polyoxyphenylmethanephenoxysiloxanes	10–40
hexamethylenetetramine	1–2.5
barium sulfate	15–30

-continued

carbon fabric	the balance.

4,020,227

MAGNETIC TAPE

Robert J. Deffeyes, Graham, Tex., assignor to Graham Magnetics Incorporated, Graham, Tex.

Continuation of Ser. No. 153,882, June 16, 1971, abandoned. This application June 16, 1976, Ser. No. 696,556

Int. Cl.² H01F 10/02

U.S. Cl. 428—306 19 Claims

1. In a magnetic recording tape of the type comprising a backing film and a magnetic coating thereon wherein said coating is formed of iron oxide magnetic particles within a resinous matrix therefor, the improvement wherein

a. the matrix resin comprises at least about 50% by weight of a poly-urethane elastomer resin characterized by a minimum elongation of about 400%, a minimum tensile strength of 6000 psi, and a minimum 300% modulus of about 1200 psi, and comprises from about 0 to 50% by weight of a supplemental resin; and

b. wherein said magnetic coating comprises said iron oxide particles having an oil absorption value of less than 50 ml per 100 grams;

wherein said magnetic coating has properties including a minimum tensile strength of about 1100 psi; a minimum elongation of about 10%; and a minimum toughness of about 100 inch-pounds per cubic inch; all said properties of said coating being measured when said coatings consists essentially of, in addition to the matrix resin, (a) at least 70% by weight of an acicular gamma Fe_2O_3 particle of a 0.5 micron length and an oil absorption of at least 25 ml per 100 grams (b) at least 3.5% by weight of carbon black having a surface area of about 230 square meters per gram and a di-butyl phthalate absorption of 185 cc per gram.

4,020,228

GEL COMPOSITION, HEAT SEALABLE SUBSTRATES, AND PROCESS FOR HEAT SEALING

Frank E. Eastes, Spartanburg, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

Filed Nov. 11, 1974, Ser. No. 522,544

Int. Cl.² C09J 7/02; B32B 27/32

U.S. Cl. 428—347 16 Claims

1. A heat sealable article comprising a solid substrate selected from the group consisting of polyolefinic and cellulosic sheets having coated on at least one surface of the substrate a substantially dry residue of a substantially wax free gel composition adapted to contact another surface in heat sealing engagement, and wherein said gel consists essentially of:

a. an aliphatic saturated monocarboxylic acid having from about 10 to about 24 carbon atoms;

b. an interpolymer of ethylene and a vinyl ester of a monocarboxylic acid having from 1 to about 4 carbon atoms;

c. a tackifying resin; and

d. an organic solvent wherein, per 100 parts by total weight of said components (a), (b) and (c), the saturated carboxylic acid component is present in an amount from about 5 to about 40 parts by weight, the interpolymer component is present in an amount from about 20 to about 60 parts by weight, and the tackifying resin is present in an amount from about 5 to about 40 parts by weight wherein said interpolymer includes from about 15 to about 50 percent by weight of said vinyl ester.

4,020,229

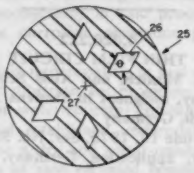
MULTI-CAVITY FILAMENTS

Paul R. Cox, Jr., Cary, N.C., assignor to Hercules Incorporated, Wilmington, Del.

Filed Aug. 7, 1975, Ser. No. 602,953

Int. Cl.² D02G 3/00

U.S. Cl. 428—372 5 Claims



1. A polypropylene filament having a substantially round cross-section, the cross-section at any point along the length of the filament having three or more cavities of substantially equal cross-section therein, each of said cavities having two legs forming a vertex angle therebetween of between about 65° and 140°, with said vertex angle being pointed substantially directly toward the center axis of the filament.

4,020,230

MICROPOROUS POLYETHYLENE HOLLOW FIBERS AND PROCESS OF PREPARING THEM

Robert D. Mahoney, Dublin, and Stephen E. Schneider, Concord, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 3, 1975, Ser. No. 619,431

Int. Cl.² B01D 47/00, 59/10; D02G 3/00

U.S. Cl. 428—398 4 Claims

1. A microporous hollow fiber in which the porosity is contiguous, the O_2 gas permeability is at least 2×10^{-5} cc (STP) per cm^2 per second per cm Hg. transmembrane pressure differential and said fiber consists essentially of polyethylene.

4,020,231

PIGMENTED PHOSPHORS AND METHOD OF MAKING

Robert A. Hedler, and W. Wentworth Slobbe, both of Seneca Falls, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Mar. 31, 1976, Ser. No. 672,249

Int. Cl.² C09K 11/08, 11/20, 11/42

U.S. Cl. 428—403 14 Claims

1. A method of making free-flowing, pigmented phosphor comprising the steps of: preparing an aqueous mixture of particles of phosphor, particles of a pigment and a free-flowing agent and mixing thoroughly; adding a precipitation causing agent in sufficient amount to cause said free-flowing agent and said pigment to co-precipitate upon and coat said phosphor; allowing said now coated phosphor to settle; removing the supernatant liquid; and drying said coated phosphor.

13. A composite article comprising: a core of a phosphor particle having the capability of emitting light in a relatively narrow frequency band containing a preferred frequency and other frequencies when excited by a suitable form of energy; said core being encapsulated by a light modifying layer; said layer being composed of a co-precipitated mixture of a material selected from the group consisting essentially of silica or pyrophosphate and a pigment which is substantially transparent to light of said preferred frequency and substantially opaque to light of said other frequencies.

4,020,232

HEAT-SENSITIVE RECORDING SHEETS

Isao Kohmura; Kiyoshi Futaki, and Kozo Haino, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed May 14, 1975, Ser. No. 577,594

Claims priority, application Japan, May 17, 1974, 49-54572; May 18, 1974, 49-55989

Int. Cl.² B41M 5/18

U.S. Cl. 428—411 17 Claims

1. A heat sensitive recording sheet which comprises a support and a heat sensitive composition coated thereon which comprises a solid amine derivative and at least one acylated lactone or sultone type acidic leuco dye capable of reacting with said amine derivative at an elevated temperature to form a color.

4,020,233

HEAT ACTIVATED ETHYLENICALLY UNSATURATED-POLYTHIOL COMPOSITIONS

Charles Robert Morgan, Brookeville, Md., assignor to W. R. Grace & Co., New York, N.Y.

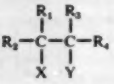
Filed Jan. 22, 1976, Ser. No. 651,365

Int. Cl.² B32B 27/06

U.S. Cl. 428—419 11 Claims

1. A heat activatable composition comprising an ethylenically unsaturated compound, a polythiol, the mole ratio of the carbon-to-carbon double bonds in the ethylenically unsaturated compound to the thiol groups in the polythiol being in the range of 1:10 to 10:1 respectively, and 0.01–5% by weight based on the weight of the ethylenically unsaturated compound and

polythiol of a pinacol of the general formula:



wherein R_1 and R_3 are members independently selected from the group consisting of a substituted and unsubstituted aromatic radicals, R_2 and R_4 are members independently selected from the group consisting of substituted and unsubstituted aliphatic and aromatic radicals and X and Y are members independently selected from the group consisting of hydroxyl, alkoxy and aryloxy.

4,020,234

HIGH-ALUMINA CONTENT COMPOSITIONS CONTAINING BAO-MGO-SiO_2 GLASS AND SINTERED CERAMIC ARTICLES MADE THEREFROM

Richard A. Gardner, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 430,329, Jan. 2, 1974, Pat. No. 3,935,017. This application Nov. 7, 1975, Ser. No. 629,811

Int. Cl.² B32B 27/40

U.S. Cl. 428—433 9 Claims

1. In a sintered multilayer ceramic sandwich comprising a plurality of ceramic layers separated by internal conductive metallization, the improvement wherein said ceramic layers consist essentially of a sintered alumina and material sinterable in a reducing atmosphere without blistering or mottling consisting essentially of alumina and a pre-fused ternary glass sintering aid from the system:

$BaO\text{-}MgO\text{-}SiO_2$

said sintering alumina ceramic material having a dielectric constant of at most 9.5, which permits adequate speeds upon use in computer circuitry, and a dissipation factor less than 0.005, said ternary glass sintering aid being selected from compositions within the area bounded by A-B-C in the Figure, which points A-B-C represent the following compositions:

Point	Mol % BaO	Mol % MgO	Mol % SiO_2
A	15.0	15.0	70.0
B	43.5	17.5	39.0
C	17.5	43.5	39.0

4,020,235

NOVEL COMPOSITE DIAPHRAGM MATERIAL

Luigi Giuffre, Milan, Italy; Vittorio De Nora, Nassau, Bahamas, and Placido Spaziante, Milan, Italy, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Filed May 7, 1975, Ser. No. 575,415

Claims priority, application Italy, Mar. 6, 1975, 20989/75

Int. Cl.² C25B 13/06, 13/08

U.S. Cl. 428—443 5 Claims

1. A composition comprising an inert fibrous material impregnated with a copolymer of styrene and divinyl benzene copolymerized directly on the material in the absence of a solvent and then sulfonated and halogenated.

4,020,236

PROCESS FOR PRODUCING A MAGNETIC MATERIAL AND MAGNETIC RECORDING MEDIUM CONTAINING THE SAME

Masashi Aonuma, and Yasuo Tamai, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 22, 1975, Ser. No. 598,098

Int. Cl.² H01F 1/02; C04B 35/04

U.S. Cl. 428—457 16 Claims

1. A process for preparing a ferromagnetic material which comprises mixing an aqueous solution containing at least a salt of Fe, Co, Fe-Co, Fe-Ni, Co-Ni and Fe-Co-Ni and whose pH has been adjusted to about 3.0 or less, with a solution of a reducing agent containing at least one boron hydride compound or a derivative thereof to perform an oxidation-reduction reaction, and adjusting the pH of the reaction mixture at the end of the reaction to at least about 3.0 or higher.

4,020,237

PAPER COVERED GYPSUM BOARD AND PROCESS OF MANUFACTURE

Romulis S. von Hazmburg, Laguna Hills, Calif., assignor to United States Gypsum Company, Chicago, Ill.

Continuation of Ser. No. 512,762, Oct. 4, 1974, abandoned, which is a continuation of Ser. No. 174,313, Oct. 15, 1971, abandoned, which is a continuation of Ser. No. 47,584, June 18, 1970, abandoned, which is a division of Ser. No. 612,351, Jan. 30, 1967, Pat. No. 3,562,097. This application Sept. 22, 1975, Ser. No. 615,271

Int. Cl.² B32B 13/00, 29/00, 31/00

U.S. Cl. 428—535 8 Claims

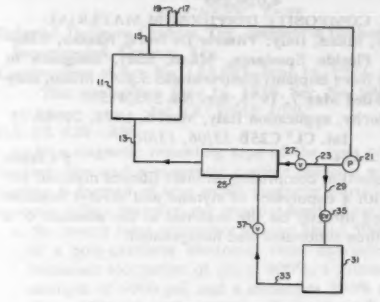
1. A gypsum board comprising a core of cast gypsum and having a porous paper cover sheet formed of a plurality of plies, said paper cover sheet consisting essentially of a major proportion of cellulosic fibers and a minor proportion of mineral fibers in an amount of from about 2 to 20% by weight of said paper cover sheet with the amount of mineral fibers in any one ply of said paper cover sheet not exceeding about 43% by weight thereof.

4,020,238

CONTROL OF GENERATION OF CHLORINE FEED FROM CHLORINE HYDRATE FOR USE IN A METAL CHLORINE ELECTRIC ENERGY STORAGE DEVICE

Philip C. Symons, Birmingham, Mich., assignor to Energy Development Associates, Madison Heights, Mich.

Continuation of Ser. No. 376,018, July 2, 1973, abandoned.
This application Apr. 7, 1975, Ser. No. 565,990
Int. Cl.² H01M 8/04
U.S. Cl. 429—15 **3 Claims**



1. An apparatus for controlling the generation and feeding of chlorine from a source of chlorine hydrate during the discharge of an electric energy storage device having an electrode compartment with a stack of metal-chlorine electrodes therein and also having an inlet means and an outlet means connected by a first conduit so as to provide a continuous electrode compartment loop, said device further having a storage compartment with an inlet means and outlet means and being adapted to contain the source of chlorine hydrate, pumping means for flowing an electrolyte in the continuous loop and which pumping means pumps continuously during discharge, a second conduit connecting said first conduit at a first point downstream of said pumping means with said storage compartment inlet means, check valve means located in the second conduit adapted to prevent backflow out from the storage compartment inlet means in response to pressure buildup in the storage compartment as the chlorine hydrate therein decomposes, a third conduit means connecting the storage compartment outlet means with said first conduit at a second point downstream of said first point and adapted to provide for flow of the decomposition products of the chlorine hydrate and electrolyte to said first conduit, a first adjustable valve means located in said first conduit between said first and second points, a second adjustable valve means located in the third conduit, said first and second adjustable valve means being adapted to be adjusted such that the pressure drop across the first adjustable valve means will balance the sum of the pressure drops across the second adjustable valve means, the resistance of the third conduit and due to the hydrate storage during flow when the check valve means is open.

4,020,239

CATHODE FOR HYDRAZINE/AIR CELL

William A. Armstrong, Ottawa, Canada, assignor to Her Majesty the Queen in right of Canada as represented by the Minister of National Defence, Ottawa, Canada

Filed Jan. 23, 1976, Ser. No. 651,741
Claims priority, application Canada, July 17, 1975, 231707
Int. Cl.² H01M 4/00
U.S. Cl. 429—42 **11 Claims**

1. A cathode for use in a hydrazine/air fuel cell comprising an electrically conductive substrate having an electrocatalyst deposited thereon, a semipermeable hydrophobic membrane applied to one side of said electrocatalyst-deposited substrate, and a hydrophilic microporous separator membrane applied to the other side of said electrocatalyst-deposited substrate,

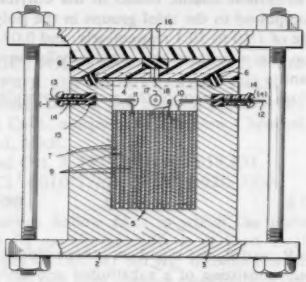
said electrocatalyst-deposited substrate being wetproofed with from 1.5 to 3 mg/cm² of polytetrafluoroethylene.

4,020,240

ELECTROCHEMICAL CELL WITH CLOVOBORATE SALT IN ELECTROLYTE AND METHOD OF OPERATION AND COMPOSITION OF MATTER

Carl R. Schlaikjer, Arlington, Mass., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed Sept. 3, 1975, Ser. No. 610,518
Int. Cl.² H01M 6/14
U.S. Cl. 429—50 **26 Claims**



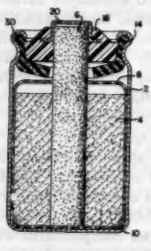
1. A composition of matter including a compound having a metal cation and a clovoborate anion as an electrolyte salt and a material selected from the group consisting of fluid oxyhalides, fluid non-metallic oxides, fluid non-metallic halides and mixtures thereof.

4,020,241

GALVANIC CELL HAVING A RESEALABLE VENT CLOSURE

Henry Heinz, Jr., Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,674
Int. Cl.² H01M 2/12
U.S. Cl. 429—54 **16 Claims**



1. In a galvanic cell comprising a container having an open

end and an inner disposed anode, a cathode within said container, a porous separator disposed between said anode and said cathode, an electrolyte disposed within said container and a cover for said container; the improvement being a resealable vent closure comprising a gas-impermeable, resiliently compressible elastomeric sponge gasket compressed between the upper wall of the container and the cover.

4,020,242

PRIMARY-CELLS

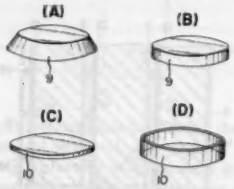
Ryoji Okazaki, Katano; Kan Aoki, and Tomoyuki Shinagawa, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 25, 1975, Ser. No. 635,257

Claims priority, application Japan, Dec. 4, 1974, 49-139715

Int. Cl.² H01M *6/00*

U.S. Cl. 429—66 **17 Claims**



1. A primary-cell wherein a cell element assembly comprising a cathode electrode, anode electrode and separator interposed between said cathode and anode is surrounded by a hermetically sealed jacket comprising a primary-cell enclosure member and a top closure member sealing said enclosure and electrically insulated therefrom, said top closure serving as one of the terminals of the primary-cell, and said cell enclosure serving as the other terminal; and a spacer between one of said electrodes and said jacket member electrically connected to said at least one of said electrodes, said spacer being chemically stable in said primary-cell, electrically conductive, and capable of holding the electrolyte and is adapted to reduce its apparent volume when pressure is applied thereto.

4,020,243

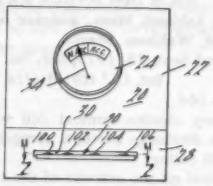
ELECTRICAL MEASURING SYSTEM FOR TESTING ELECTRICAL COMPONENTS

William G. Oldford, 4944 Lakeshore Road, Lexington, Mich. 48450

Continuation of Ser. No. 453,850, March 22, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,691

Int. Cl.² H01M *2/10*

U.S. Cl. 429—93 **12 Claims**



1. An electrical measuring arrangement for testing electrical components having at least a first and second terminal comprising a package for the electrical component including a body portion enclosing the electrical component, a tab portion extending from said body portion and continguous therewith, first and second electrical conductors extending from said body portion through said tab portion, said conductors extending to the exterior of said tab portion, said conductors being in contact with said first and second terminals of the electrical component, said conductors within said tab portion being spaced apart a predetermined distance in accordance with an electrical characteristic of said electrical component, and a console assembly having an indicator mounted thereon for indicating an electrical condition of the electrical component, and receptacle assembly for receiving said tab portion and operable in response to said characteristic, including circuit means within said console for connecting said first and second conductors with said indicating means in accordance with said characteristic, said tab portion of said package assembly being removably inserted within said receptacle assembly of said console and cooperating therewith in such a manner that said indicator is electrically connected to a selected portion of said circuit means and said electrical component so as to display an electrical condition thereof said circuit portion being selected by said predetermined spaced apart distance of said conductors.

4,020,244

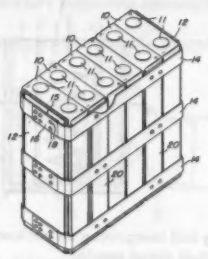
CLAMPING STRUCTURE FOR BATTERY CELLS

George Joseph Selinko, Lighthouse Point, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 550,253, Feb. 18, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,398

Int. Cl.² H01M *2/10*

U.S. Cl. 429—100 **8 Claims**



1. A self-supporting battery cell clamping structure for use with a stack of rechargeable battery cells to prevent expansion of the cells in response to the build-up of pressure therein, including in combination.

first and second pressure plates for positioning against substantially the entire surface area presented by the ends of the stack of cells, and

a plurality of strips adapted for positioning about the stack of cells and engaging said pressure plates, said strips each having ends secured together to form a pre-tightented band to hold said pressure plates against movement with respect to each other and prevent expansion of the cells positioned between said plates.

4,020,245

CELL ADAPTER

Kenichi Mabuchi, and Yoshihisa Tsuchimochi, both of Tokyo, Japan, assignors to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed Oct. 31, 1975, Ser. No. 627,674

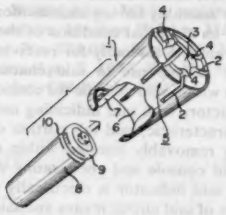
Claims priority, application Japan, Nov. 6, 1974, 49-133685[U]; Nov. 20, 1974, 49-142271[U]

Int. Cl.² H01M *2/10*

U.S. Cl. 429—100 **4 Claims**

1. A cell adapter comprising a hollow cylindrical body having an outer diameter agreeing with a predetermined diametral size, an opening formed in the top end face of said hollow cylindrical body, slits cut in said top end face and the peripheral wall of said hollow cylindrical body and extending from said peripheral wall of the hollow cylindrical body to said

opening thereof, and tongue members formed in said top end face by said slits, the tips of said tongue members together



form a circle, said slits and tongue members providing a resilient means for elastically holding the cell inserted.

4,020,246

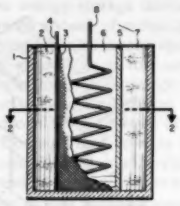
LOW TEMPERATURE PRIMARY ELECTROLYTE CELL

Eddie T. Seo, Torrance; Herbert P. Silverman, Orange, and Robert J. Day, Manhattan Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Continuation-in-part of Ser. No. 448,158, March 4, 1974, abandoned. This application Jan. 21, 1976, Ser. No. 651,013

Int. Cl.² H01M 6/14

U.S. Cl. 429—104 **10 Claims**



1. A primary cell comprising an enclosed container having:
A. a solid alkali metal anode;
B. a ceramic electrolyte separator;
C. a liquid cathode;
D. means to conduct electric current to the exterior of said container; and
wherein said anode is in intimate contact with said separator, and said cathode is in intimate contact with the opposite side of said separator.

4,020,247

WATER ACTIVATED PRIMARY BATTERIES

Dennis Courtney Parsons Birt, Bournemouth; Ronald Holland, Wareham, and Leonard John Pearce, Broadstone, all of England, assignors to The Secretary of State for Defense in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

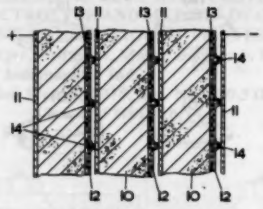
Continuation-in-part of Ser. No. 539,683, Jan. 9, 1975, abandoned. This application May 10, 1976, Ser. No. 684,984

Claims priority, application United Kingdom, Jan. 9, 1974, 1082/74; July 31, 1974, 33839/74

Int. Cl.² H01M 6/34

U.S. Cl. 429—119 **6 Claims**

1. A water activated primary battery comprising a plurality of cells which are assembled in juxtaposed relation to one another, each of said cells being of sandwich construction and comprising a cathode consisting of a flat layer of porous cathode material having an imperforate electrically conductive flat backing plate in surface engagement with one flat side of said porous layer, said cell including a porous membrane of electrically insulating sheet material in surface engagement with the other flat side of said porous cathode layer, said porous membrane being permeable to the flow of liquids and gases therethrough, and said cell further including an anode constituting a flat plate of conductive material extending in a plane substantially parallel to the plane of said cathode backing plate in surface engagement with the side of said porous, insulating membrane remote from said porous cathode layer, said conductive anode plate being perforated to permit entry of electrolyte for said cell through the perforations in said anode plate to said porous cathode layer via said intervening porous membrane of insulating material during initial priming of the cell, as well as subsequent ingress of fresh electrolyte through said perforated anode during discharge of the cell, and to facilitate the escape of gas from within the cell through said porous membrane and thence through the perforations in said anode plate during operation of said cell, the conductive anode plate in each of said cells being formed with an array of integral conductive dimples extending in spaced relation to one another outwardly of the plane of said anode plate in a direction away from the cathode of said cell, said plurality of



cells being juxtaposed and maintained in assembled configuration under pressure with their respective anodes and cathodes positioned in substantially parallel relation to one another and with the outwardly extending conductive dimples of the perforated anode in each cell being in direct pressure engagement with the outer surface of the conductive cathode backing plate of the next adjacent cell thereby to provide the direct electrical connection between the conductive anode plate of one cell and the conductive cathode backing plate of the next adjacent cell as well as to provide uniform compaction of the plural layers of porous cathode material in said battery, said arrays of dimples further defining planar gaps located respectively between the outermost surface of the perforated anode plate of each cell and the outermost surface of the cathode backing plate of the next adjacent cell, said gaps acting as electrolyte passageways within said battery through which electrolyte may flow on the anode side of each cell remote from the cathode of said cell for entry of electrolyte into each cell through the perforated anode of said cell and thence through the porous insulating membrane of said cell.

4,020,248

PRIMARY ELECTROCHEMICAL CELL CAPABLE OF HIGH DISCHARGE RATES

Franz Goebel, Ashland, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Sept. 18, 1975, Ser. No. 614,451

Int. Cl.² H01M 6/14

U.S. Cl. 429—164 **19 Claims**

1. A primary electrochemical cell which is capable of achieving high discharge currents comprising
an outer cell casing,
a first terminal on the exterior of the casing,
an electrochemical system for a primary electrochemical cell including
an anode material connected to the first terminal,
a cathode material comprising a plurality of porous, semi-rigid, discrete globules having the following composition: from about 40 to 99 weight percent of carbon black, at least 1 percent of a mechanical binder which is inert in the primary electochemical cell, and the remainder being graphite, said discrete globules being

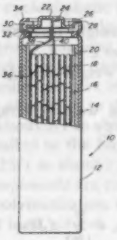
spaced from one another to thereby define spaces therebetween, and

an electrolytic solution including a cathode depolarizer that is electrochemically reduced on the surface of the cathode material during discharge of said cell,

a porous separator of non-conductive material disposed between the anode material and the cathode material,

a second terminal located on the exterior of the casing,

means for electrically insulating the second terminal from the first terminal, and



a cathode current collector connecting the cathode material to the second terminal, the cathode current collector comprising a plurality of electrically interconnected layers of porous metallic material, the cathode material globules being interposed between the layers of cathode current collector so that the cathode current collector extends throughout the cathode material, the electrolytic solution being diffused throughout the porous separator and the porous cathode current collector through the spaces between the plurality of discrete cathode globules.

4,020,249

PHOTODEGRADABLE POLYOLEFINS CONTAINING HALOALKYL- OR HALOBENZENE-SULFONYL HALIDES

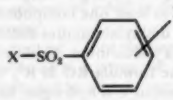
Bernard Freedman, Berkeley, and Martin J. Diamond, Oakland, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 603,080, Aug. 8, 1975, Pat. No. 3,968,096, which is a division of Ser. No. 543,706, Jan. 23, 1975, Pat. No. 3,929,723. This application Apr. 21, 1976, Ser. No. 678,818

Int. Cl.² C08J *3/20*

U.S. Cl. 526—3 **4 Claims**

1. A photodegradable composition comprising a polyolefin and about from 0.1 to 10%, based on the weight of polyolefin, of an additive of the structure



wherein:

each X is chlorine, bromine, or iodine

p is an integer from 1 to 5, inclusive.

4,020,250

PREPARATION OF HALOGENATED POLYMERS

Joginder Lal, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 484,736, July 1, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 710,500

Int. Cl.² C08F *210/00, 212/00*

U.S. Cl. 526—13 **9 Claims**

1. Halogenated interpolymer compositions consisting of the reaction product of one or more α-olefins having 4 to 20 carbon atoms with one or more nonconjugated polyolefins having from 5 to 40 carbon atoms, said α-olefins and non-conjugated polyolefins having been polymerized in the presence of coordination catalysts to form unsaturated interpolymers, said unsaturated interpolymers being characterized by having pendant groups containing double bonds, and subsequently reacting said unsaturated interpolymers with halogenating compounds.

4,020,251

1,3-CYCLODIENE-ACYCLIC CONJUGATED DIENE COPOLYMERS

Henry L. Hsieh, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 446,426, Feb. 27, 1974, abandoned. This application Mar. 17, 1975, Ser. No. 559,197

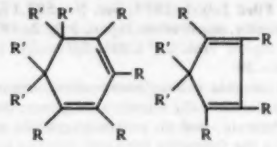
Int. Cl.² C08F *4/08, 8/04, 232/06*

U.S. Cl. 526—20 **21 Claims**

1. A method for the production of a copolymer by polymerizing a monomer mixture consisting essentially of

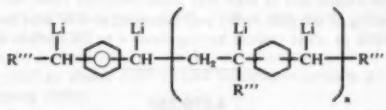
1,3-butadiene;

a 1,3-cyclodiene represented by the general formulas



wherein R is selected from the group consisting of hydrogen, methyl and ethyl radicals, R′ is selected from the group consisting of hydrogen, cycloalkyl, aryl and linear and branced alkyl radicals such that the maximum number of carbon atoms per R′ radical is about 6 and the total number of carbon atoms per cyclodiene monomer is in the range of from about 5 to 20;

an organolithium initiator consisting of alpha-lithio multisubstituted dialkylbenzenes and dialkylbenzene oligomers represented by the general formula



wherein R‴ is a linear or branched alkyl containing 2 to 12 carbon atoms, and *n* is an integer from 0 to 2;

optionally a vinylaromatic compound containing in the range of from about 8 to 14 carbon atoms per molecule;

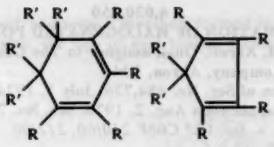
optionally an ether or tertiary amine in an amount in the range of from about 0.01 to 50 parts by weight per 100 parts by weight monomer; and

optionally a hydrocarbon diluent which is not detrimental to said polymerization.

14. A copolymer consisting essentially of

units of 1,3-butadiene;

units of a 1,3-cyclodiene represented by the general formulas



wherein R is selected from the group consisting of hydrogen, methyl and ethyl radicals, R′ is selected from the group consisting of hydrogen, cycloalkyl, aryl and linear and branched alkyl radicals such that the maximum number of carbon atoms per R′ radical is about 6 and the total number of carbon atoms per cyclodiene monomer is in the range of from about 5 to 20;

optionally units of a vinylaromatic compound containing in the range of from about 8 to 14 carbon atoms per molecule; and

wherein the 1,3-butadiene portion of said copolymer has a trans and vinyl content ranging from about 48 to 99 percent when said copolymer does not contain units of said vinylaromatic compound and 39 to 99 percent when said copolymer does contain units of said vinylaromatic compound.

4,020,252

VULCANIZATION ACCELERATOR SYSTEM FOR RUBBER COMPOSITIONS

Iwao Sugiyama; Teruhide Furuhama, both of Hiratsuka; Fumiaki Nagano, Chigasaki, and Hiroshi Hirakawa, Isehara, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

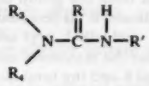
Filed July 1, 1975, Ser. No. 592,173

Claims priority, application Japan, July 2, 1974, 49-74986

Int. Cl.² C08K *5/39*

U.S. Cl. 526—30 **4 Claims**

1. A vulcanizable rubber composition comprising rubber containing an olefinically unsaturated group; ferric ethylene-bisdithiocarbamate; and an amine-isocyanate addition compound having the following formula:



in which R_3 and R_4 each represent a mono-valent hydrocarbon radical having from 1 to 8 carbon atoms; or together, a divalent hydrocarbon radical having from 2 to 7 carbon atoms; or together, a divalent non-acidic radical having from 2 to 8 carbon atoms and at least one atom selected from the group consisting of oxygen, sulfur and nitrogen; and R′ represents an aromatic or alkyl radical having from 4 to 18 carbon atoms.

4,020,253

STRESS-CRACK RESISTANT ETHYLENE-PERHALOETHYLENE COPOLYMERS

Stephen R. Schulze, Gillette, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 2, 1975, Ser. No. 564,232

Int. Cl.² C08F *210/02*

U.S. Cl. 526—89 **23 Claims**

1. Copolymers of from about 40 to about 60 mol percent ethylene and correspondingly from about 60 to about 40 mol percent of a halogenated comonomer selected from the group consisting of tetrafluoroethylene, chlorotrifluoroethylene and mixtures thereof and containing high and low molecular weight components of said copolymers such that equations (1) and (2) are satisfied:

$$\sum_{i=1}^{\infty} X_i \overline{M}w_i = f \cdot \overline{M}w, \text{ and} \quad (1)$$

$$0.02 \leq \frac{\overline{M}w \sum_{i=1}^{\infty} X_i}{\sum_{i=1}^{\infty} X_i \overline{M}w_i} \leq 0.6, \quad (2)$$

wherein

X_i represents the weight fraction of each high molecular weight component i.

$\overline{M}w$ represents the weight-average molecular weight of the copolymer,

$\overline{M}w_i$ represents the weight-average molecular weight of each component i,

$$\overline{M}w = \sum_{i=1}^{\infty} X_i \overline{M}w_i + \sum_{j=1}^{\infty} X_j \overline{M}w_j$$

wherein

X_j represents the weight fraction of each low molecular weight component j, and

$\overline{M}w_j$ represents the weight-average molecular weight of each component j, and

$0.1 \leq f \leq 0.95$, the high molecular weight components having a weight-average molecular weight, expressed in terms of melt index, of from about 0.0001 to 1.0 and the low molecular weight components having a weight-average molecular weight, expressed in terms of melt index, of from about 3 to 3000,

and therefore wherein said copolymers contain from 0.2 to 57 weight percent of said high molecular weight components and from 99.8 to 43 weight percent of said low molecular weight components.

4,020,254

METATHESIS POLYMERIZATION OF CYCLOOLEFINS

Eilert A. Ofstead, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 510,528, Sept. 30, 1974, abandoned. This application June 20, 1975, Ser. No. 588,981

Int. Cl.² C08F *4/72, 32/04*

U.S. Cl. 526—128 **7 Claims**

1. A cycloolefin methathesis polymerization process comprising contacting at least one unsaturated alicyclic compound selected from the group consisting of (1) unsaturated alicyclic compounds containing five carbon atoms in the ring and containing one double bond in the ring, (2) non-conjugated unsaturated alicyclic compounds containing at least seven carbon atoms in the ring and at least one double bond in the ring, and (3) polycyclic olefins and diolefins, by subjecting said alicyclic compounds or mixtures thereof to a catalyst system comprising (A) at least one transition metal salt selected from the group consisting of tungsten halides and tungsten oxyhalides, (B) at least one compound selected from the group consisting of dialkylaluminum halides, alkylaluminum sesquihalides and alkylaluminum dihalides, and (C) at least one compound of the formula RO Si R'_3 wherein R is CH_3— or Y-CH_2CH_2—, wherein Y is hydrogen, halogen, nitrile, alkyl containing from 1 to 4 carbon atoms or alkoxy containing from 1 to 4 carbon atoms and where R′ is a methyl or ethyl radical and where the molar ratios of A/B/C is within the range of 1/0.5–10/0.5–3.

4,020,255

CONTINUOUS INSITU CATALYST ADDITION FOR POLYBUTADIENE POLYMERIZATION

Donald P. Schoneman, Tallmadge, and Robert W. Stachowiak, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 7, 1975, Ser. No. 575,311
Int. Cl.² C08F 4/14, 4/70, 136/06
U.S. Cl. 526—133 5 Claims

1. A method of preparing high cis-1,4-polybutadiene which comprises continuously polymerizing butadiene in mixture with an inert aliphatic or cycloaliphatic solvent employing as a catalyst a mixture comprising (A) at least one trialkyl aluminum wherein the alkyl group contains from 2 to 8 carbon atoms, (B) at least one nickel salt of carboxylic acids and (C) at least one boron trifluoride complex of ethers, wherein the mole ratio of the trialkyl aluminum to the nickel salt of carboxylic acid ranges from about 3/1 to about 90/1 and the mole ratio of the aluminum trialkyl to the boron trifluoride etherates ranges from about 0.25/1 to about 1.2/1, in which each of the individual catalyst components are continuously and separately injected into the polymerization vessel containing the mixture of butadiene and inert solvent.

4,020,256

METHOD FOR PREPARING POLYMERS FROM WATER SOLUBLE VINYL MONOMERS

Maurice L. Zweigle, and Samuel J. Kasley, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed July 3, 1975, Ser. No. 593,157
Int. Cl.² C08F 2/34, 2/10, 4/34, 20/56
U.S. Cl. 526—88 5 Claims

1. A method for preparing a polymer from a water-soluble vinyl monomer which comprises forming a concentrated aqueous solution of said monomer containing a peroxide catalyst in the amount of from about 50 to 500 parts by weight per million parts of vinyl monomer, purging said solution until substantially free of inhibitory oxygen and spraying the purged solution at a temperature of from about 15° to about 30° C into an atmosphere substantially free of oxygen and containing a catalytic amount of sulfur dioxide gas.

4,020,257

CATALYSTS

Josef Witte, Cologne, and Gunther Lehnert, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 523,022, Nov. 12, 1974, Pat. No. 3,966,637. This application June 24, 1975, Ser. No. 589,935
Claims priority, application Germany, Nov. 16, 1973, 2357193
Int. Cl.² C08F 4/22, 32/04
U.S. Cl. 526—143 4 Claims

1. A process for the ring opening polymerization of monocyclic monoolefins having 4, 5 or from 7 to 12 carbon atoms in the ring, said process comprising contacting a 5 to 50% by weight solution of at least one of said monocyclic monoolefins in an inert organic solvent at −60° to 60° C. with a catalyst composition comprising:

A. a reaction product of 1 mol tungsten hexachloride with from 1 to 4 mols of a mixture of 2-chloroethanol and 2,2,2-trichloroethanol in a molar ratio of from 1:3 to 3:1 and

B. from 1 to 20 mol, per mol of tungsten in component (A), of an organometallic aluminum compound,

said catalyst composition being employed in a quantity supplying from 0.05 to 10 mmol tungsten per 100 g. of said olefin.

4,020,258

ADDITION OF COUPLING AGENT DURING ORGANOLITHIUM INITIATED POLYMERIZATIONS

Ralph C. Farrar, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 195,810, Nov. 4, 1971, abandoned. This application Mar. 1, 1974, Ser. No. 447,203
Int. Cl.² C08F 4/08, 4/16
U.S. Cl. 526—178 26 Claims

1. In a process for the polymerization of at least one polymerizable monomer comprising a polymerizable conjugated diene, polymerizable monovinyl-substituted aromatic compound, or both, under polymerization conditions with an organolithium initiator, the improvement which comprises adding to the polymerization reaction system commencing after at least about 3 percent monomer conversion and prior to about 75 percent conversion at least one nonpolymerizable silicon or tin coupling agent essentially continuously during at least a portion of the remaining course of said polymerization, thereby preparing a polymer of improved processability.

4,020,259

PROCESS FOR THE POLYMERIZATION OF ALLYL HALIDES

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 551,534, Feb. 21, 1975, which is a continuation-in-part of Ser. No. 71,628, Sept. 11, 1970, abandoned. This application Oct. 15, 1975, Ser. No. 622,525
Int. Cl.² C08F 2/00, 4/16, 14/14, 214/16
U.S. Cl. 526—194 6 Claims

1. The process for the production of poly(allyl halide) polymer which comprises the steps of:

a. providing a quantity of silicon acid;

b. mixing therewith an allyl halide in the ratio of 1 part by weight of silicon acid to 2 parts by weight of an allyl halide,

c. agitating said mixture in a closed system and keeping the temperature between 0° and 100° C for about 20 to 40 minutes at ambient pressure; thereby

d. producing poly(allyl halide) polymer.

4,020,260

NOVEL HYDROCARBON RESINS COMPRISING 1,3-PENTADIENE, 1,5,9-CYCLODODECATRIENE AND OPTIONALLY MONOOLEFIN

Shozo Shiozaki; Yonesaku Shinohara, both of Yokohama, and Takeo Miyake, Fujisawa, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Mar. 10, 1975, Ser. No. 557,128
Claims priority, application Japan, Mar. 12, 1974, 49-28384
Int. Cl.² C08F 236/04; C08L 7/00; C08F 4/00, 232/00
U.S. Cl. 526—237 5 Claims

1. A hydrocarbon resin having a softening point of from about 100° to about 160° C and being substantially gel-free comprising about

95–35% by weight of units derived from 1,3-pentadiene,

1–50% by weight of units derived from 1,5,9-cyclododecatriene, and

0–40% by weight of units derived from at least one monoolefin containing 5 carbon atoms, said resin obtained by polymerizing a monomeric mixture comprising about

95–35% by weight of 1,3-pentadiene,

1–50% by weight of 1,5,9-cyclododecatriene, and

0–50% by weight of at least one monoolefin containing 5 carbon atoms,

in the presence of a solvent containing at least 50% by weight of an aromatic hydrocarbon and about 0.1–5 parts by weight, per 100 parts by weight of the monomeric mixture of a Friedel-Crafts type metal halide catalyst selected from aluminum halide and boron trifluoride.

4,020,261

COPY SHEET FOR USE IN PRESSURE SENSITIVE MANIFOLD SHEET

Shinichi Oda, Amagasaki; Akira Nakanishi, Sakai, and Takio Kuroda, Amagasaki, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1975, Ser. No. 560,794

Claims priority, application Japan, Mar. 26, 1974, 49-34211

Int. Cl.² B41M 5/00

U.S. Cl. 428—325 **9 Claims**

1. In a copy sheet for use in pressure senstive manifold sheets of a transfer-copy system comprising a support having coated thereon a layer of electron accepting reactant material including a binder, an improvement which is characterized in that said electron accepting reactant material is a calcined activated clay which is pulverized in water to a particle size at least 10% smaller, based on the mean particle size thereof, than before the pulverization and has a resulting mean particle size of 1 to 10 μ.

4,020,262

METHOD OF APPLYING PHOSPHORAMIDE-HYDROXYMETHYL PHOSPHINE CONDENSATION PRODUCTS FOR TEXTILE FIRE RETARDATION

Destin A. LeBlanc, and Robert Bruce LeBlanc, both of Wickford, R.I., assignors to LeBlanc Research Corporation, East Greenwich, R.I.

Filed Feb. 24, 1975, Ser. No. 552,501

Int. Cl.² C09K 3/28; C09D 5/18

U.S. Cl. 428—276 **8 Claims**

2. The process for rendering a textile material flame retardant comprising impregnating said material with a solution containing about 15–60% by weight of a condensation product of (a) at least one hydroxy-methyl phosphorus compound selected from the group consisting of

$(CH_2OH)_4P—Y$ and $(CH_2OH)_3P$

with (b) about 0.33 to 3 times the molar amount of at least one substituted phosphoramide of the formula

$PO(NR^1CH_3)(NR^2CH_3)(NR^3CH_3)$

wherein

R^1 and R^2 each independently is H or CH_2OH,

R^3 is H, CH_2OH or CH_3, and

Y is an equivalent amount of at least one anion of an acid, said solution further containing at least one member selected from the group consisting of a melamine-formaldehyde resin, urea, and thiourea in about 2 to 50% by weight of the condensation product, drying said material and curing said material by heating.

4,020,263

PROCESS FOR THE PRODUCTION OF EMULSION POLYVINYL CHLORIDE UNDER AVOIDANCE OF VINYL CHLORIDE EMISSIONS

Hermann Winter; Alfred Lautsch; Karl-Heinz Schönberg, and Jürgen Walther, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

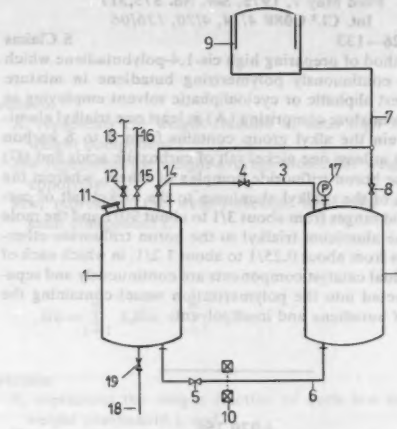
Filed Sept. 3, 1975, Ser. No. 610,069

Claims priority, application Germany, Sept. 5, 1974, 2442575

Int. Cl.² C08F 3/30, 1/98, 1/13

U.S. Cl. 526—88 **8 Claims**

1. In a process for the batch polymerization of vinyl chloride in which successive large scale chloride emulsion polymerizations are conducted at an emulsifier level of up to 0.9% by weight, based on the vinyl chloride, in a reactor at elevated temperature and pressure to a solids content of at least 48%, in the presence of sufficient excess vinyl chloride to maintain gaseous vinyl chloride in the reactor under pressure at the end of the polymerizations, and the polymerizate is discharged from the reactor between polymerizations, the improvement which comprises reducing vinyl chloride emissions from the gaseous phase of the reactor by discharging the liquid phase only of the polymerizate to a closed discharge zone at a pressure differential of 0.1–2.5 atmospheres lower than the reactor, provided by the residual vinyl chloride in the reactor; maintaining the reactor unopened between polymerizations; and then conducting another vinyl chloride polymerization in the reactor in the presence of the residual gaseous vinyl chloride remaining in the reactor from the prior polymerization.



4,020,264

CRYSTALLINE POLYOLEFINS AND PRODUCTION THEREOF

Junichi Hotta, and Masaki Fujii, both of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Japan

Continuation-in-part of Ser. No. 45,269, June 10, 1970, abandoned. This application Dec. 20, 1971, Ser. No. 210,194

Claims priority, application Japan, June 19, 1969, 44-48605

Int. Cl.² C08F 4/66, 10/06

U.S. Cl. 526—142 **15 Claims**

1. A process for producing crystalline propylene polymers which comprises polymerizing propylene in the presence of a catalytic system comprising, in combination, (1) an organoaluminum compound and (2) a modified titanium composition prepared by mill processing for at least one hour (a) a titanium trichloride and (b) methyl methacrylate, the weight ratio of compound (b) to compound (a) being 0.01 to 0.3:1.

4,020,265

POLYACETYLENE TETRAPOLYMERS

Dwain M. White, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 330,497, Feb. 8, 1973, Pat. No. 3,816,374, which is a continuation-in-part of Ser. No. 118,467, Feb. 24, 1971, abandoned. This application Dec. 17, 1973, Ser. No. 425,244

Int. Cl.² C08F 38/02

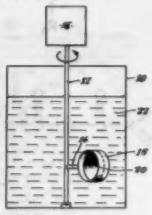
U.S. Cl. 526—285 **1 Claim**

1. Polyacetylene tetrapolymers consisting essentially of from about 5% by weight of acetylene units and 95% by weight of a mixture of units consisting essentially of 74 to 86 mole percent of meta-diethynylbenzene units, 4 to 9 mole percent of para-diethynylbenzene units and 5 to 15 mole percent of diethynylalkane units, where the sum of the units in said mixture of units is 100 mole percent.

4,020,266
ORIENTED CRYSTALLIZATION OF POLYMERS

Frederick Charles Frank, Orchard Cottage, Grove Road, Coombe Dingle; Andrew Keller, 41 Westbury Road, Westbury-on-Trym, both of Bristol 9, and Malcolm Robert Mackley, Springfield Cottage, Richmond Dale, Clifton, Bristol 8, all of England

Filed Jan. 23, 1975, Ser. No. 543,355
Int. Cl.² C08F 6/06
U.S. Cl. 528—498 **5 Claims**



1. A process which comprises causing a solution of a synthetic crystallizable polymer, selected from the group consisting of polyethylene, nylon and polypropylene, to flow through a gauze at a temperature less than the dissolution temperature of the polymer in the solvent but above the temperature at which the polymer crystallizes spontaneously from the solution, and at a flow rate through the gauze producing a longitudinal velocity gradient in the solution, of the order of 10^3 sec^{-1} or greater, sufficient to produce crystallization of the polymer downstream of the gauze in the form of fibrils having an extended chain molecular core surrounded by folded chain molecular polymer of relatively lower melting point.

4,020,267
REMOVAL OF RESIDUAL MONOMER IN THE PRESENCE OF WATER BY DIELECTRIC HEATING

Anthony John Park, South Croydon, England, assignor to The British Petroleum Company Limited, London, England

Filed Dec. 11, 1975, Ser. No. 639,968
Claims priority, application United Kingdom, Dec. 16, 1974, 54156/74; Apr. 30, 1975, 17967/75
Int. Cl.² C08F 6/00
U.S. Cl. 528—503 **15 Claims**

1. A process for reducing the residual vinyl halide monomer content of a particulate vinyl halide polymer containing at least 1% by weight of water based on the weight of dry polymer which comprises subjecting the polymer to a radiofrequency dielectric heating step to remove vinyl halide while maintaining the presence of water in the polymer so that not more than 30% by weight of the water present at the beginning of the dielectric heating evaporates during the dielectric heating, and recovering particulate polymer from the radiofrequency dielectric heating step.

4,020,268
AGAROSE CONTAINING AFFINITY MATRIX MATERIALS

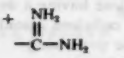
A. Hirotoshi Nishikawa, and Harry F. Hixson, Jr., both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 306,241, Nov. 13, 1972, abandoned, which is a division of Ser. No. 141,778, May 12, 1971, Pat. No. 3,746,622. This application Nov. 21, 1974, Ser. No. 526,028
Int. Cl.² C07H 11/02; C08B 37/02, 37/06
U.S. Cl. 536—1 **1 Claim**

1. An affinity matrix material consisting essentially of an insoluble matrix material consisting essentially of agarose covalently bonded to a leash molecule succinaminohexamethylamine which is covalently bonded to a ligand satisfying the formula:

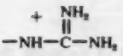
$$X-A-R$$

wherein X is



(amidinium)

or



(guanidinium)

A is selected from the group consisting of benzoyl, norvalyl, phenyl, hexyl, cyclohexyl, and pentyl and R is

— $(CH_2)_yZ$,
— $O(CH_2)_yZ$,
— $S(CH_2)_yZ$, or
— $S-S(CH_2)_yZ$

where Z is NH, COOH, I, Br, Cl COCl, NCS, NCO, SO_2Cl, and where y is 0 to 3.

4,020,269
EPIMINODEAMINODEOXYAMINOGLYCOSIDE ANTIBIOTICS AND INTERMEDIATES

Kentaro Hiraga, Kyoto; Tetsuya Okutani, Osaka; Tsunehiko Asako, and Kouichi Yoshioka, both of Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd.,Osaka, Japan

Filed Apr. 8, 1975, Ser. No. 566,519
Claims priority, application Japan, Apr. 10, 1974, 49-41367; Apr. 10, 1974, 49-41368; June 25, 1974, 49-72945
Int. Cl.² C07H 15/22
U.S. Cl. 536—10 **12 Claims**

1. A method for the production of a deoxyaminoglycoside antibiotic selected from the group consisting of (1) 3'-and/or 5''-deoxyneomycin and (2) 3'-and/or 2''-deoxykanamycin antibiotics, which comprise reacting the corresponding phosphorylated aminoglycode with a silylating agent selected from the group consisting of halosilanes, silyl compounds of amines, bissilyl compounds of carboxylic acid amides, monosilyl compounds of carboxylic acid amides, silyl derivatives of imidazole, a mixture of a trialkylsilane and a metal catalyst, and a mixture of a dialkyarylsilane and a metal catalyst, and subjecting the thus obtained intermediate to catalytic reduction, electrolytic reduction, reduction with a reducing agent or reduction with a Grignard reagent.

4,020,270
L-LYXOHEX-1-ENOPYRANOSE DERIVATIVE

Federico Arcamone, Milan, and Giuseppe Cassinelli, Voghera (Pavia), both of Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

Division of Ser. No. 568,437, April 16, 1975. This application Jan. 19, 1976, Ser. No. 650,519
Claims priority, application United Kingdom, May 2, 1974, 19209/74
Int. Cl.² C07H 5/06
U.S. Cl. 536—18 **1 Claim**

1. 1,2,3,6-Tetradeoxy-3-trifluoroacctamido-4-trifluoroacetoxy-L-lyxo-hex-1-enopyranose.

4,020,271

CROSSLINKED PHOSPHONOALKYL CELLULOSE AND ABSORBENT DEVICES INCORPORATING SAME

Pronoy Kumar Chatterjee, Spotswood, N.J., assignor to Personal Products Company, Milltown, N.J.

Filed Jan. 13, 1975, Ser. No. 540,368

Int. Cl.² A61F *13/20*; C08B *11/00*, *15/00*

U.S. Cl. 536—88 **22 Claims**

1. A crosslinked phosphonoalkyl cellulose having a degree of crosslinking sufficient to make said cellulose essentially insoluble in aqueous media, said cellulose containing

groups wherein R is an alkylene radical of no more than 5 carbon atoms and wherein M is a member selected from the group consisting of alkali metal ions and ammonium ions, said cellulose containing from about 1.5% to about 4.0% phosphorous by weight.

4,020,272

PREPARATION OF STARCH ESTERS

Martin M. Tessler, Edison, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

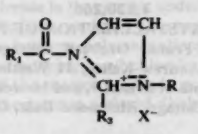
Filed Dec. 22, 1975, Ser. No. 643,321

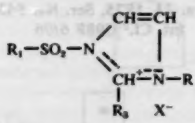
Int. Cl.² C08B *31/02*

U.S. Cl. 536—107 **7 Claims**

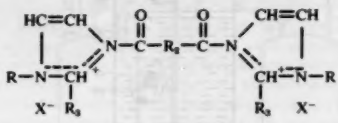
1. A process for preparing esters of a starch having free reactive hydroxyl groups comprising the steps of:

a. reacting said starch with a N,N′-disubstituted imidazolium salt selected from the group consisting of





and



wherein R is selected from the group consisting of lower alkyl (C_1–C_4) and lower alkenyl (C_2–C_4); R_1 is selected from the group consisting of alkyl, substituted alkyl, alkenyl, cycloalkyl, aryl, substituted aryl, and arylalkyl; R_2 is selected from the group consisting of alkylene, substituted alkylene, bisalkylene ether, cycloalkylene, arylene and substituted arylene; and R_3 is selected from the group consisting of lower alkyl or H; R_1 and R_2 may each contain between 1 and 20 carbons; and X is Br^- or Cl^-; wherein the reaction with the starch is conducted in an aqueous medium at a pH level of from about 5.0 to 12.5 at temperatures of from 5° to 55° C. for a period of from about 10 minutes to 20 hours, employing the N,N′-disubstituted imidazolium salt in an amount of 0.10 to 100 percent on the weight of dry starch; and

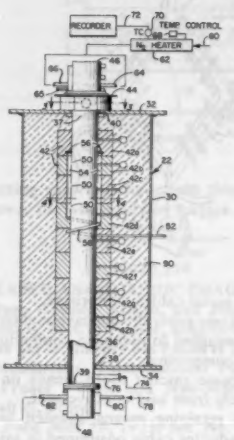
b. isolating the resultant starch derivative.

4,020,273

VERTICAL PYROLYSIS FURNACE FOR USE IN THE PRODUCTION OF CARBON FIBERS

Robert Dix, Wayne, N.J.; Richard F. Markel, Greenville, S.C.; James A. Parker, Charlotte, N.C.; John P. Riggs, New Providence, and Dale T. Vest, Summit, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,515
Int. Cl.² H05B 3/00
U.S. Cl. 13—7 15 Claims



1. In an apparatus for the continuous production of carbon fibers via thermal processing having a stabilization furnace and an improved pyrolysis furnace for pyrolyzing a continuous length of stabilized fibrous material in an inert gaseous atmosphere after treatment in the stabilization furnace, the pyrolysis furnace comprising:

conduit means having an inlet end, an outlet end, operable to receive a continuous length of stabilized fibrous material, and operable to function in a generally vertical posture such that the inlet end is vertically above the outlet end;

a plurality of heating zones longitudinally positioned along the conduit means, being independently controlled so that a predetermined temperature profile may be obtained and being operable to transfer heat to a continuous length of stabilized fibrous material passing downwardly through said conduit means;

insulation means surrounding the plurality of heating zones and the conduit means and operable to minimize heat loss to the environment;

exhaust means having a fiber inlet and a chamber with physical dimensions exceeding the lateral extent of the conduit means, being in fluid communication with the inlet end of the conduit means, and operable to receive toxic gaseous by-products from the conduit means;

environment protecting seal means provided at the fiber inlet of the exhaust means and at the conduit outlet and being operable to prevent toxic gaseous by-products from escaping to the environment while preventing environmental oxygen from entering the pyrolysis furnace; and

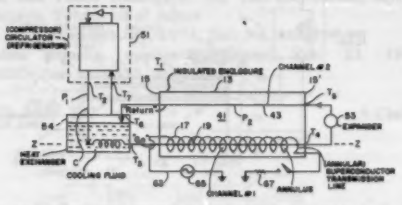
inert atmosphere control means communicating with the seal means, the inlet end, and the outlet end of the conduit means and being operable to maintain an inert gaseous atmosphere in the furnace while convectively sweeping toxic gaseous by-products from the conduit means to the exhaust means.

4,020,274

SUPERCONDUCTING CABLE COOLING SYSTEM BY HELIUM GAS AND A MIXTURE OF GAS AND LIQUID HELIUM

John W. Dean, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 27, 1976, Ser. No. 649,887
Int. Cl.² H01B 12/00
U.S. Cl. 174—15 S 10 Claims



1. Cryogenic cooling apparatus for a consumer having a source of cryogenic cooling fluid under pressure for use with a longitudinally extending superconducting transmission line having an insulating enclosure with opposite terminals comprising:

a. cryogenic cooling fluid;

b. longitudinally extending superconductor transmission line means forming a first channel for circulating the cryogenic cooling fluid as a gas in a first stream at a first low temperature and a first high pressure in a first go direction;

c. enclosure means encircling the transmission line means and forming a second channel in thermal contact with the first channel and the transmission line means for circulating the cryogenic cooling fluid as a boiling liquid-gas mixture at a second constant temperature and at a reduced, low, constant, second pressure in a second return direction opposite to said first go direction;

d. first means for circulating the cryogenic fluid as a gas in the first channel at said first high pressure;

e. second means for circulating the cryogenic cooling fluid as a liquid-gas mixture in the second channel at said second constant temperature and reduced, low constant second pressure to provide thermally contacting, oppositely streaming, cryogenic fluid streams in the same enclosure in a closed cycle at said different pressures, respectively, and

f. means forming a heat exchanger between the counterstreaming streams in the go and return directions between the transmission line and the first means for maintaining the first and second temperatures nearly equal and at least as low as 4.5 K.

4,020,275

SUPERCONDUCTING CABLE COOLING SYSTEM BY HELIUM GAS AT TWO PRESSURES

John W. Dean, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 27, 1976, Ser. No. 649,888
Int. Cl.² H01B 12/00
U.S. Cl. 174—15 S 10 Claims

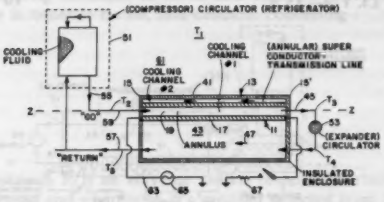
1. Cryogenic cooling apparatus for a consumer having a source of cryogenic cooling fluid under pressure for use with a longitudinally extending superconducting transmission line having an insulating enclosure with opposite terminals comprising:

a. cryogenic cooling fluid;

b. longitudinally extending superconductor transmission

line means forming a first channel for circulating the cryogenic cooling fluid in a first stream at a first temperature range and pressure in a first go direction;

c. enclosure means encircling the transmission line means and forming a second channel in thermal contact with the first channel and the transmission line means for circulating the cryogenic cooling fluid at a second temperature range and pressure in a second return direction opposite to said first go direction;



d. first means for circulating the cryogenic fluid as a high pressure gas in the first channel at said first temperature range and pressure; and

e. second means for circulating the cryogenic cooling fluid as a gas in the second channel at said second temperature range and pressure to provide thermally contacting, oppositely streaming, cryogenic fluid streams in the same enclosure in a closed cycle at said different temperatures and pressures, respectively.

4,020,276

SEALANT BARRIER FOR ELECTRICAL CABLES

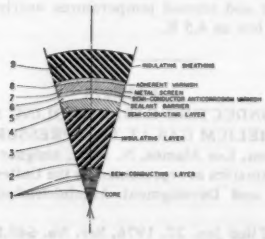
Jean-Marie Maingueneau, Brignoud, France, assignor to SCAL - Societe de Conditionnements en Aluminum, Paris, France

Filed Mar. 19, 1976, Ser. No. 668,620

Claims priority, application France, Apr. 11, 1975, 75.12410; June 13, 1975, 75.19156

Int. Cl.² H01B 7/28

U.S. Cl. 174—23 R **8 Claims**



1. In an electrical cable having a metal core, an insulation covering the core, a semiconductive layer over the insulation covering and a metal screen, the improvement comprising a longitudinal sealant barrier between said screen and said semiconductive layer, said barrier comprising a layer of a thermofusible mixture coated on the inner surface of said screen and a plurality of spaced rings formed of the same material between said coating and said semiconductive layer.

4,020,277

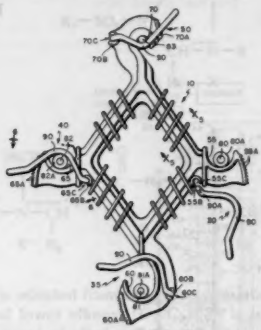
SPACER FOR AERIAL CABLES

Ernest Joseph La Chance, Sr., Milford, and Leonard Paul Jean, Nashua, both of N.H., assignors to Hendrix Wire & Cable Corporation, Milford, N.H.

Filed Feb. 26, 1976, Ser. No. 661,718

Int. Cl.² H02G 7/12; H01B 17/16; F16G 11/00

U.S. Cl. 174—146 **11 Claims**



1. In a spacer for aerial cables comprising,

a body and at least one generally concave seat on said body, said seat being adapted to receive a conductor cable,

the improvement comprising,

first generally arcuate ratchet tooth means on said body located outwardly from said concave seat,

generally arcuate retaining means adapted to engage a surface of a conductor cable positioned in said seat, and pivot means operative independently of the relative position of said retaining means to said body for maintaining a pivotal connection therebetween, said pivot means being located adjacent to the side of said seat which is located opposite to said first ratchet tooth means,

said retaining means comprising second generally arcuate ratchet tooth means spaced from said pivot means for engaging said first ratchet tooth means,

whereby upon rotation of said retaining means to cable engaging position, the teeth of said second ratchet tooth means engage a teeth of said first ratchet tooth means and thereby are adapted to hold a conductor cable in said seat.

4,020,278

DATA CARRIER FOR OPTICAL READ-OUT

Bernard Carré; Claude Puech, and Erich Spitz, all of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Oct. 16, 1975, Ser. No. 623,077

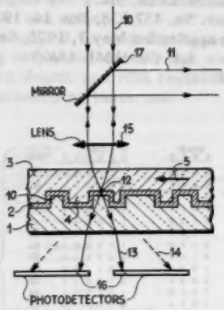
Claims priority, application France, Oct. 18, 1974, 74.35148

Int. Cl.² G11B 7/24; H04N 5/76; G06K 19/06

U.S. Cl. 358—128 **4 Claims**

1. A data carrier for optical read-out with a predetermined radiation, said data carrier comprising: a substrate transparent to said radiation, an embossed pattern representative of said data provided at the surface of said substrate, a thin metal layer deposited upon said embossed pattern and a protective

layer transparent to said radiation overlaying said metal layer; the thickness of said thin metal layer being selected for partially reflecting said radiation; said thin metal layer being deposited over the whole of said surface.



4,020,279

ADJUSTABLE ANAMORPHIC IMAGE CONVERTER

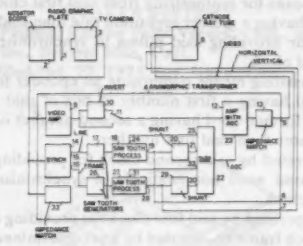
Christian Jean Gautier, Acigne, and Jean-Marie Pierre Scarabin, Rennes, both of France, assignors to L'Etat Francais, represente par le Ministre des Postes et Telecommunications, Issy-les-Moulineaux; Establissement Public dit "Telediffusion de France", Paris and Jean-Marie Pierre Scarabin, Rennes, all of, France

Filed June 16, 1975, Ser. No. 587,225

Claims priority, application France, June 14, 1974, 74.21539

Int. Cl.² H04N 7/18

U.S. Cl. 358—160 **8 Claims**



1. In an adjustable anamorphic transformer for images analyzed by a television camera or equivalent, means from transmitting output signals for said camera through said transformer to an image display tube having horizontal and vertical deflection plates, said transformer comprising means for generating saw tooth signals having variable slopes which are between two consecutive points for the horizontal or vertical scannings of the image display tube, comprising means for generating saw tooth signals of fixed slope responsive to synchronization signals taken from signals transmitted by a television camera, a plurality of parallel connected saw tooth processing circuits, means for applying the output of said fixed slope saw tooth generator means to said plurality of saw tooth circuits, each of said processing circuits comprising amplifier means with an adjustable threshold, means for applying the output of said amplifier to a non-inverting current amplifier having gain and to an inverting amplifier of unity gain, means for applying the respective outputs of said non-inverting and said inverting amplifiers to the ends of a potentiometer having a movable slide which is connected to the output of the saw tooth processing circuit, the outputs of the processing circuits being connected to a summing circuit, and means for connecting the output of said summing circuit to horizontal or vertical deflection plates of the image display tube.

4,020,280

PULSE WIDTH LUMINANCE MODULATION SYSTEM FOR A DC GAS DISCHARGE DISPLAY PANEL

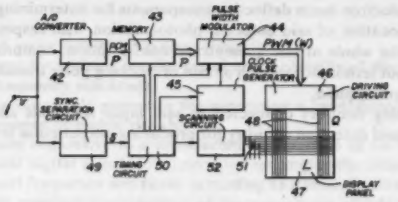
Ryuichi Kaneko, No. 5956, Ikuta, Tama, Kawasaki; Minori Yokozawa, No. 7-1, 5-chome, Misono, Sagamihara; Shigemitsu Suzuki, No. 5280, Higashi-Shinozaki, Edogawa, Tokyo, and Takeo Kamegaya, No. 10-14, 3-chome, Kyodo, Setagaya, Tokyo, all of Japan

Filed Feb. 20, 1974, Ser. No. 444,017

Claims priority, application Japan, Feb. 21, 1973, 48-20263; Nov. 2, 1973, 48-122936

Int. Cl.² H04N 3/00

U.S. Cl. 358—242 **9 Claims**



1. A pulse width luminance modulation system for controlling the operation of a dc gas discharge display panel having a working time lag, comprising:

a means for converting an input signal to be displayed into a pulse width modulated signal having a pulse width corresponding to the amplitude of the input signal; and

a discharge display panel driving circuit means connected to said converter means, including means for producing a low luminance picture range by making instantaneous irradiation from a discharge cell of said display panel having an intensity corresponding to the pulse width of said modulated signal when the pulse width of the pulse width modulated signal is narrower than a certain value corresponding to the working time lag and for producing a middle to high luminance picture range when said pulse width is wider than said certain value by including means for causing the discharge cell to produce glow discharge whihc is sustained for a duration in proportion to the wider pulse width, and wherein said discharge display panel driving circui means comprises a time constant circuit, of which the time constant is such that the gradient of the characteristics between the pulse width of the modulated signal and the luminance intensity both for the instantaneous irradiation and the glow discharge are a smooth curve.

4,020,281

ITERATIVE COORDINATE DATA APPROXIMATION SYSTEM FOR PHOTOEMISSIVE PIXEL PATTERN DISPLAYS

John Ephraim Davis, Jr., San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 13, 1976, Ser. No. 657,788

Int. Cl.² G08C 21/00; H01J 29/46

U.S. Cl. 178—18 **15 Claims**

8. An iterative coordinate data approximation system for a cathode ray beam tube contiguous pixel pattern display, comprising

a cathode ray tube having a cathode ray beam forming electron gun assembly, a target assembly spaced at a distance from said gun assembly, electron beam deflecting components arranged along said tube intermediate said assemblies for deflecting the electron beam emanat-

ing from said gun assembly over said target assembly in contiguous lines defining a regular geometrical configuration in two dimensions, and electron beam modulating circuitry arranged in conjunction with said tube for varying the intensity of said electron beam pixel by pixel for displaying information;

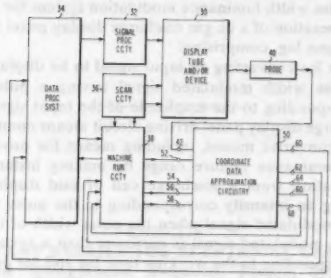
a photoresponsive probe element having a photoemissive aperture stop intercepting a multiple of contiguous pixel in portions of a plurality of contiguous lines having a multiple of contiguous pixel capable of exhibiting a predetermined characteristic level of intensity of photoemission and arranged for receiving photoemission emanating from said target assembly,

circuitry connected to said probe element for the detection of said predetermined characteristic of intensity of photoemission,

circuitry coupled to said detection circuitry and to said electron beam deflecting components for determining the location of said detected photoemission with respect to the whole of said geometrical configuration, comprising

input terminals to which a train of clocking pulse transitions are applied,

gating circuitry connected to said input terminals and to said detection circuitry for producing output pulse transi-



tions at clocking rate during detection only of the presence of said electron beam at the pixel intercepted by said probe element,

counting circuitry coupled to said gating circuitry for counting said pulse transitions,

registering circuitry,

transferring circuitry intercoupling said counting and said registering circuitry for transferring a count from said counting circuitry to said registering circuitry,

comparing circuitry coupled to said counting and said registering circuitry for deriving a comparison of the contents of said counting and registering circuitry,

storing circuitry for storing comparisons,

transfer circuitry coupled to said comparing and said storing circuitry for transferring the resulting comparison to said storing circuitry,

sensing circuitry coupled between said comparing circuitry and said storing circuitry for sensing a change in sign of the difference between the comparisons stored,

further circuitry connected to said sensing circuitry and responsive thereto for delivering coordinate data stored in said counting circuitry at the change of sign sensed by the sensing circuitry and thereby determining said coordinate data substantially at the center pixel of said aperture stop.

4,020,282

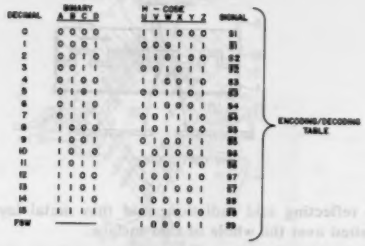
HIGH DENSITY DATA PROCESSING SYSTEM

Peter H. Halpern, Longwood, Fla., assignor to General Dynamics Corporation, St. Louis, Mo.

Division of Ser. No. 432,938, Jan. 14, 1974, Pat. No. 3,921,210. This application May 7, 1975, Ser. No. 575,317

Int. Cl.² H04L *15/00*

U.S. Cl. 178—68 **9 Claims**



1. A system for transmitting digital data in the form of signals having a high density of power in the power spectrum thereof which represents the difference among different signals, said system comprising

means for transmitting signals representing a word of said data in the first plurality of consecutive time slots each occupied by a different bit of said data,

means for translating said word into a plurality of pulses of opposite polarity in a second plurality of consecutive time slots, the sum of the amplitudes of said pulses being equal to zero,

said second plurality of time slots being greater in number than said first plurality thereof,

said transmitting means including means for providing a first clock synchronous with the bits of said digital data and means for synthesizing from said first clock a second clock having a greater repetition rate than said first clock,

means for providing said pulses in synchronism with said second clock,

said translating means comprising an encoder for encoding a word having a first number of bits of said digital data into a format word having a second number of bits which is greater than said first number,

means operated by said second clock for providing the bits of said second word consecutively in synchronism with said second clock,

means operated by said first clock for providing a sync pulse for each frame constituted by a predetermined number of words of said digital data,

means for compressing the rate of said first clock by a number of first clock pulses per second equal to the number of bits in one of said first words, and

means included in said translating means operated by said sync pulse for producing a second word corresponding to a frame sync word.

4,020,283

MSK DIGITAL DATA SYNCHRONIZATION DETECTOR

Marvin Aaron Epstein, Monsey, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Nov. 4, 1975, Ser. No. 628,710

Int. Cl.² H04L *27/10;* **H03K** *7/06*

U.S. Cl. 178—88 **9 Claims**

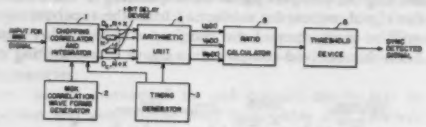
1. A minimum shift keying (MSK) digital data synchronization detector comprising:

an input for said digital data;

first means coupled to said input to produce five different output signals, a first of said five output signals being a first correlation signal, a second of said five output signals being a second correlation signal shifted in phase by one

data bit time, a third of said five output signals being said first correlation signal shifted in phase one data bit time, a fourth of said first output signals being said second correlation signal and a fifth of said five output signals equals a minus one value;

second means coupled to said first means, said second means being responsive to said five output signals to produce third, fourth and fifth correlation signals as a function of assumed bit times; and



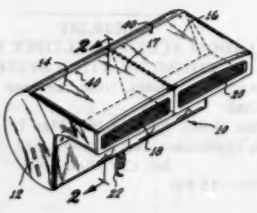
third means coupled to said second means, said third means being responsive to said third, fourth and fifth correlation signals to produce a ratio signal proportional to a ratio of a minimum magnitude squared to a maximum magnitude squared for all carrier phase angles for each of said assumed bit times and to produce a synchronization detected signal when the value of said ratio signal is less than a given amplitude threshold.

4,020,284

SPEAKER SYSTEM

William W. Phillips, Rancho Palos Verdes, Calif., assignor to Shaymar, Inc., Beverly Hills, Calif.

Filed Oct. 22, 1975, Ser. No. 624,607
Int. Cl.² H04R 1/32
U.S. Cl. 179—1 E **25 Claims**



1. An enclosed loud speaker system for converting applied electrical signals to sounds and for directing the sounds toward a listener's ears without contacting the listener's ears, comprising:

two loud speaker assemblies, each including at least one loud speaker; and

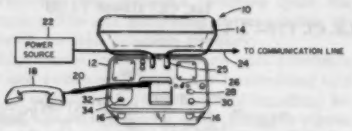
a housing of a rigid material substantially surrounding said speaker assemblies on all sides to form a chamber substantially occupied by said speakers, having two ducts for directing the sounds produced by said speakers. toward the listener's ears each duct defining a passage from said chamber to the space outside said housing, and opening into said chamber at a location adjacent one of said loud speaker assemblies, said housing having positioning portions on its inside surface to define the position of said loud speaker assemblies within said chamber.

4,020,285

VOICE SECURITY METHOD AND SYSTEM

Kenneth M. Branscome, Dallas; William M. Feath, Irving; George E. Goode, Richardson; Kenneth W. Heizer, and Barrie O. Morgan, both of Dallas, all of Tex., assignors to Datotek, Inc., Dallas, Tex.

Division of Ser. No. 293,412, Sept. 29, 1972, Pat. No. 3,886,313. This application Jan. 29, 1975, Ser. No. 545,084
Int. Cl.² H04K 1/04
U.S. Cl. 179—1.5 R **8 Claims**



1. A voice scrambler system comprising:

means for splitting a voice signal into a plurality of discrete frequency sub-bands;

a random code generator for generating a randomized sequence of digital signals;

means responsive to a preselected first portion of each of said digital signals for randomly rearranging the order of said frequency sub-bands according to a limited subset of all possible combinations of rearrangement of said frequency sub-bands, said subset being chosen to include only the most unintelligible of said possible combinations; and

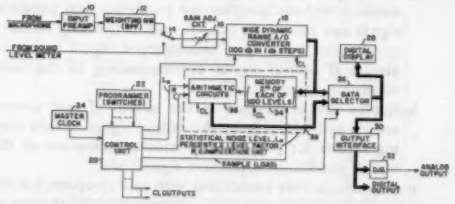
means responsive to a preselected second portion of each of said digital signals for randomly inverting selected ones of said frequency sub-bands.

4,020,286

SIGNAL ANALYSIS APPARATUS FOR AMPLITUDE STATISTICS

Barry L. Ceci, Rochester, N.Y., assignor to Metrosonics, Inc., Rochester, N.Y.

Filed May 19, 1975, Ser. No. 578,690
Int. Cl.² G10L 1/00
U.S. Cl. 179—1.5 A **24 Claims**



3. A signal analysis system which can analyze the statistical characteristics of signals while they occur in real time which system comprises

a. means for converting in real time an input signal into first digital signals corresponding to the level of said input signal in a multiplicity of steps each representing a different successively higher value of the level of said signals,

b. means operative in real time and responsive to said first digital signals for generating and storing second digital signals each corresponding to a different one of said first digital signals and representing the number of said first digital signals which correspond thereto occurring during a given period of time,

c. means also operative in real time responsive to said second digital signals for providing output signals representing statistical characteristics of said input signals, and

d. said converting means being analog to digital converter

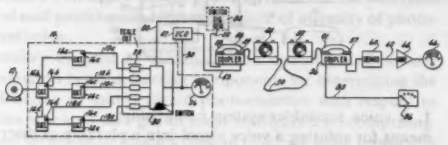
means for continuously following variations in amplitude of said input signal, said analog to digital converter means having a counter for generating said first digital signals.

4,020,287

TELEPHONIC TROUBLESHOOTING CIRCUIT FOR ELECTRIC MOTOR DRIVES

Alan W. Wilkerson, Thiensville, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed Mar. 3, 1975, Ser. No. 554,506
Int. Cl.² H04M 11/00
U.S. Cl. 179—2 A **6 Claims**



1. An electric motor drive, the operative condition of which may be remotely ascertained with conventional telephone connection means and lines, comprising:

circuitry means for energizing the electric motor, said circuitry means having a plurality of test points providing operative condition responsive signals suitable for diagnosing the condition of the circuitry;

switch means having an input coupled to said test points for obtaining said condition responsive signals and having an output providing a selected condition responsive signal;

signal generating means coupled to the output of said switch means for generating audio tones indicative of the magnitude and polarity of said selected condition responsive signal and having a frequency suitable for transmission over conventional telephone lines;

a first audio telephone coupler connected to said signal generating means and connectable to telephone connection means and lines;

a second audio telephone coupler connectable to said telephone connection means and lines;

converting means having an input connected to said second audio telephone coupler for receiving said transmission signal and having an output, said converting means converting the audio tone transmission signal to an analog electrical output signal corresponding to the selected condition responsive signal;

indicator means coupled to the output of said converting means and operable by the output signal of said converting means for providing a remote indication of the selected condition responsive signal; and

means operatively associated with said couplers for obtaining voice communication over said telephone connection means and lines.

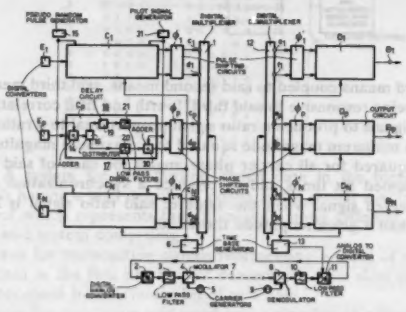
4,020,288

SYSTEM FOR DATA TRANSMISSION THROUGH THE CHANNELS OF A FREQUENCY DIVISION MULTIPLEX SYSTEM

Maurice Georges Bellanger, Antony, and Jacques Lucien Daguet, St. Maur des Fosses, both of France, assignors to Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France

Filed Oct. 17, 1975, Ser. No. 623,349
Claims priority, application France, Oct. 30, 1974, 74.36235
Int. Cl.² H04J 1/08
U.S. Cl. 179—15 FD **7 Claims**

1. A parallel data transmission system in which data signals are converted into multilevel digital signals and transmitted through channels of a frequency division multiplex system, which channels are separated by means of digital filters having a linear phase characteristic, each channel comprising two quadrature sub-channels for transmitting two data signals which jointly constitutes a complex data signal transmitted by said channel characterized in that the transmitter side comprises means for adding to the data signal in one of the said sub-channels of each channel a pilot signal whose frequency is half the interval between adjacent center frequencies of the said multiplex channels and in that the receiver side successively comprises filter means at the output of each channel for selecting the complex signal corresponding to the transmitted pilot signal, means for subtacting from the received complex signal in each channel the received complex pilot signal to obtain the received complex data signal, phase shifting means



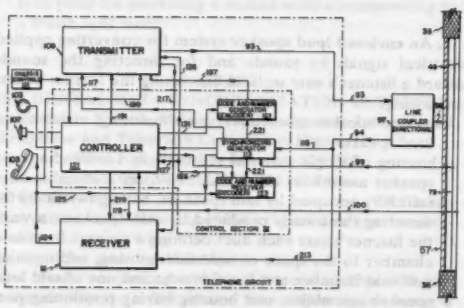
for shifting the phase of the said received complex data signal over an angle of equal magnitude but of opposite sign of the phase of the received complex pilot signal, and a pair of digital filter circuits for processing the complex data signal supplied by the said phase shifting means, said filter circuits being identical and having the transfer function of a low-pass filter with a cut-off frequency equal to the pilot signal frequency, each filter circuit comprising at least a calculating unit constructed as a digital filter and comprising a first fixed coefficient part at whose input the data signal is multiplied by a predetermined component of the received complex pilot signal, and a second variable coefficient part whose coefficients are derived from the components of the received complex pilot signal.

4,020,289

RANDOM ACCESS, MULTIPLE STATION COMMUNICATION SYSTEM

Scott K. Anderson, Orem, Utah, assignor to Teleplex, Inc., Orem, Utah

Continuation of Ser. No. 253,265, May 15, 1972, abandoned. This application Aug. 4, 1975, Ser. No. 601,363
Int. Cl.² H04J 1/06
U.S. Cl. 179—15 FD **5 Claims**



1. A random access, multiple station communication system comprising:

a plurality of stations interconnected by transmit and receive conductors, each of said stations having transmitter means to transmit on various selected bands of transmission frequencies over the said interconnecting transmit and receive conductors a signal consisting of carrier and data components and receiver means adapted to receive transmissions from other stations only in said selected frequency band assigned to and identified with said receiver means;

a signal generator connected by control conductors to the said stations to generate intervaled pulse trains which are impressed on said control conductors evenly spaced over time as radio frequency signals in a frequency band different from the said various selected bands of transmission frequencies;

control means connected to said control conductors to operate and control the said transmitter and receiver means, said control means comprising means to generate coded control pulses and means to impress the said coded control pulses on the said intervaled pulse trains;

each of the said stations including means to achieve synchronization in phase and frequency with the said intervaled pulse train radio frequency signals; and

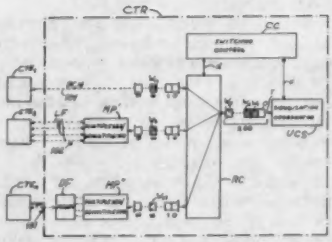
means to interrupt the transmission of at least one of the said carrier and data components when the said control means receive and send said coded control pulses which consists of electromagnetic pulses or the absence thereof within the said intervaled pulse trains and convey control information between said stations to effect system control functions; and

wherein a first said station including memory means and means to transfer an identity signal of at least one other station transmitted to the said first station to the said memory means.

4,020,290
SIGNALIZATION COORDINATOR FOR PCM SWITCHING SYSTEM

Aldo Perna, Varese, and Manlio Springolo, Milan, both of Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Dec. 18, 1975, Ser. No. 642,196
Claims priority, application Italy, Dec. 19, 1974, 30745/74
Int. Cl.² H04J *3/00*
U.S. Cl. 179—15 AT **10 Claims**



1. In a telecommunication system wherein an exchange, serving n multichannel links of m channels each, includes switching circuitry for establishing temporary connections between calling lines and called lines, accessible through incoming and outgoing channels of different links, and control means for operating said switching circuitry in response to incoming switching signals in the form of code words occupying predetermined time positions in PCM message frames forming part of incoming channel branches, operation of said switching circuitry giving rise to response signals to be transmitted in the form of code words occupying predetermined time positions in PCM message frames forming part of outgoing channel branches,

the combination therewith of a signalization coordinator in said exchange comprising:

clock means for establishing a recurrent switching cycle divided into a multiplicity of time slots;

first interface means connected to said links for receiving therefrom, in said switching cycle, incoming code words from all said channels in a predetermined sequence whereby each channel is unequivocally identified by the time position of its code words in said switching cycle;

processor means controlled by said clock means and connected to said first interface means for periodically evaluating, in respective time slots of a switching cycle, the incoming code words and generating corresponding binary commands for said switching circuitry;

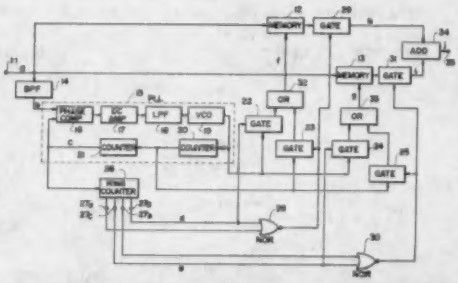
second interface means inserted between said processor means and said switching circuitry for transmitting said commands to said switching circuitry and receiving binary response signals therefrom, said processor means being connected to said second interface means for conversion of said response signals into outgoing code words; and

circulating memory means connected to said processor means for periodically presenting said outgoing code words to said first interface means for retransmission to the respective channels during corresponding time slots of successive switching cycles.

4,020,291
SYSTEM FOR TIME COMPRESSION AND EXPANSION OF AUDIO SIGNALS

Masatsugu Kitamura, and Harukuni Kobari, both of Fujisawa, Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Aug. 20, 1975, Ser. No. 606,228
Claims priority, application Japan, Aug. 23, 1974, 49-96170; Aug. 28, 1974, 49-97981; Aug. 30, 1974, 49-98927; Aug. 23, 1974, 49-100210
Int. Cl.² H04B *1/66*; G11B *5/00*
U.S. Cl. 179—15.55 T **7 Claims**



1. A system for time compression and expansion of voice signals operating cooperatively with an apparatus for reproducing a tempo p times the tempo at the time of recording, p being a number which is not equal to one, said system comprising:

first and second shift registers having a predetermined number of elements;

means for supplying to said first and second shift registers a voice signal reproduced by the apparatus;

filtering means responsive to the voice signal for selectively passing the fundamental frequency component of the voice signal;

means responsive to the output signal of said filtering means for producing a first clock pulse signal having a frequency a predetermined number times the frequency of the fundamental frequency component and a second clock pulse signal having a frequency $1/p$ times the frequency of the first clock pulse signal, respectively, in synchronism with the output signal of said filtering means;

ring counter means for producing control pulse signals in synchronism with the output signal of said filtering means such a manner that the control pulse signals have a pulse width corresponding to the frequency of the fundamental frequency component and the phases of the control pulse signals are different with each other;

first gating means for passing the first clock pulse signal therethrough to apply to said first and second shift registers;

second gating means for passing the second clock pulse signal therethrough to apply to said first and second shift registers;

third gating means for passing the output signals of the first and second shift registers therethrough;

control means responsive to the control pulse signals for controlling the passing periods of the first, second and third gating means to alternately apply the first clock pulse signal to said first and second shift registers and alternately apply the second clock pulse signal to said first and second shift registers such that said first and second shift registers alternately receive the first clock pulse signal and the second clock pulse signal, and said third gating means passes the output signal of the first shift register only during periods in which the first shift register receives the second clock pulse signal and passes the output signal of the second shift register only during periods in which the second shift register receives the second clock pulse signal; the passing period for said first gating means being equal to the time interval corresponding to the pulse width of the control pulse signals; and

means for extracting a voice signal which has passed through said third gating means as a time compressed or expanded signal.

4,020,292

BAND-COMPRESSOR DEVICE

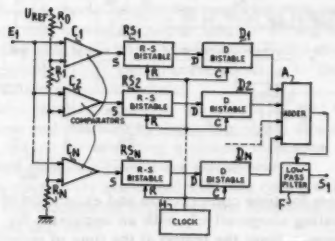
Jean-Claude Charlot, and Jean-Claude Falconnier, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Dec. 3, 1975, Ser. No. 637,469

Claims priority, application France, Dec. 6, 1974, 74.40034

Int. Cl.² H04B 1/66

U.S. Cl. 179—15.55 R **6 Claims**



1. A band-compression device ocmprising an input terminal designed to receive a signal occupying a frequency range of width W, means for encoding said input signal in the form of N digital signals respectively corresponding to the value of the amplitude of the input signal with respect to N quantizing levels where N is a whole number, a clock circuit for producing pulses having a recurrence frequency less than said width W, N RS-type bistable trigger stages having first inputs respectively connected to the outputs of said encoding means and having second inputs connected to said clock, N D-type bistable trigger stages having first inputs respectively connected to the outputs of said N RS-type bistable stages and having second inputs connected to said clock, and N-input decoding means connected to the outputs of said D-type bistable stages for producing a signal whose bandwidth is compressed.

4,020,293

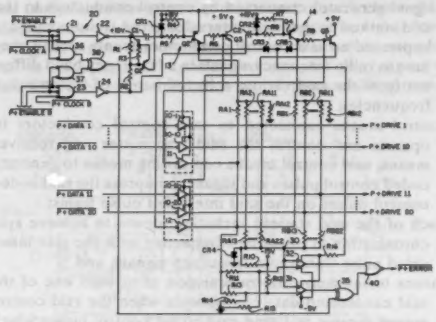
DRIVE CIRCUITRY WITH ERROR DETECTION AND COMPENSATING THRESHOLD ARRANGEMENT

Albert H. Ashley, Holliston, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Feb. 25, 1976, Ser. No. 661,260

Int. Cl.² H04M 3/00; G06F 11/08

U.S. Cl. 179—18 GF **10 Claims**



1. Apparatus for transmitting signals along a plurality of paths and for determining whether or not signals are being transmitted on a predetermined number of the paths, said apparatus including in combination

a plurality of signal paths, each signal path including

an input terminal adapted to receive input signal data,

an output terminal, and

a driving means having an input connection coupled to said input terminal and an output connection coupled to said output terminal;

additional driving means having an input connection and an output connection;

activating means coupled to the driving means of the plurality and to the additional driving means for applying operating potentials to the driving means;

each of said driving means being operable to produce a first output voltage at its output connection in response to a first input condition at its input connection, and being operable to produce a second output voltage at its output connection in response to a second input condition at its input connection when operating potentials are applied thereto by the activating means;

a resistance network comprising an equal plurality of resistances, each resistance having one end connected to the output connection of a different one of the driving means of said plurality and the other end connected to a common juncture, the voltage level produced at the common juncture being proportional to the number of output connections having said first output voltage present thereon;

first comparator means having a first and a second input, the first input being connected to said common juncture;

first threshold setting means connected to the output connection of said additional driving means and to the second input of the first comparator means, said first threshold setting means being operable to produce a voltage at the second input to the first comparator means which is less than the voltage produced at the first input to the first comparator means when a predetermined number (N) of output connections of the driving means of said plurality have said first output voltage present thereon and greater than the voltage produced at the first input to the first comparator means when said predetermined number minus one (N−1) of output connections of the driving means of said plurality have said first output voltage present thereon;

said first comparator means being operable to produce a first output signal when the voltage at its first input is less

than that at its second input and to produce a second output signal when the voltage at its first input is more than that at its second input;

second comparator means having a first and a second input, the first input being connected to said common juncture;

second threshold setting means connected to the output connection of said additional driving means and to the second input of thesecond comparator means, said second threshold setting means being operable to produce a voltage at the second input to the second comparator means which is less than the voltage produced at the first input of the second comparator means when said predetermined number plus one ($N+1$) output connections of the driving means of said plurality have said first output voltage present thereon and greater than the voltage produced at the first input to the second comparator means when said predetermined number (N) of output connections of the driving means of said plurality have said first output voltage present thereon;

said second comparator means being operable to produce a first output signal when the voltage at its first input is less than that at its second input and to produce a second output signal when the voltage at its first input is more than that at its second input; and

output means coupled to said first and second comparator means for producing an error signal in response to a first output signal from the first comparator means or a second output signal from the second comparator means.

4,020,294

PRESENCE AND DIRECTION OF LINE CURRENT FLOW DETECTOR

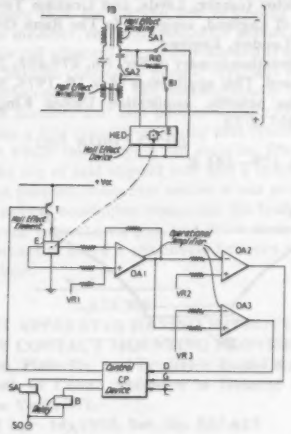
Ryszard Kitajewski, Broxbourne; Anthony William Sweet, Stortford, and Michael Philip Dyer, Old Harlow, all of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,312

Claims priority, application United Kingdom, Apr. 1, 1975, 13201/75

Int. Cl.² H04B *3/46*; H04M *3/22*

U.S. Cl. 179—18 FA **18 Claims**



14. The combination comprising:

a Hall effect device to monitor the presence of and the direction of flow of a current on a conductor, said device having an output signal whose polarity depends on the direction of flow of said current; and

a circuit arrangement connected to said device, said arrangement having two output terminals, one of said output terminals providing a logic level 1 and the other of said output terminals providing a logic level 0 when said output signal has one polarity and said other of said output terminals providing a logic level 1 and said one of said output terminals providing a logic level 0 when said output signal has a polarity opposite to said one polarity.

4,020,295

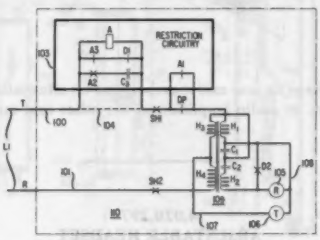
ROTARY DIAL RESTRICTION CIRCUIT

Edward Joseph Vuotto, Katonah, N.Y., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed June 16, 1975, Ser. No. 586,894

Int. Cl.² H04M *1/66*

U.S. Cl. 179—90 D **1 Claim**



1. A restricted rotary dial telephone set for use on a telephone line in a telephone system having automated operator services, said set preventing generation of dial pulses corresponding to a called telephone number not prefixed with an initial 0 digit and allowing generation of dial pulses corresponding to an initial dialed 0 digit plus an entire called telephone number to allow said set to operate with said automated operator services for providing public telephone service without deposit of coins, said set comprising:

a rotary dial mechanism having a gear wheel rotatable during dialing operations,

dial pulse contacts connected in series with said line, said contacts being intermittently operable by said gear wheel,

a relay having a winding, said winding having a first and a second terminal and being connected in series with said line and said dial pulse contacts, said relay further having normally-open contacts connected to said first terminal and normally-closed contacts shunting said dial pulse contacts,

a set of normally-closed control contacts bridging said relay winding to prevent operation of said relay,

a pin secured to said gear wheel, said pin arranged to strike and open said control contacts to enable said relay to operate when said dial mechanism is wound into position for dialing a "0" digit, and

a capacitor connected in series with said normally-open contacts and said second terminal to hold said relay operated during dialing of subsequent digits after an initial 0 digit.

4,020,296

ELECTROACOUSTIC TRANSDUCER

Jon G. Dahlquist, 500 E. 85th St., New York, N.Y. 10028

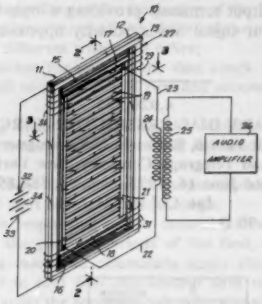
Filed Jan. 19, 1976, Ser. No. 650,146

Int. Cl.² H04R *9/00*

U.S. Cl. 179—115.5 PV **6 Claims**

1. An electroacoustical transducer comprising a substantially planar acoustically transparent solenoid coil member including a plurality of substantially equally spaced-apart individual turns bounding an area in space, a radiating diaphragm movably mounted within said area, a plural path

conductor member on said diaphragm in proximate spaced relation to the turns of said solenoid, and means for impressing



a D.C. voltage on one said member, and an alternating current signal from an audio amplifier on the other said member.

4,020,297

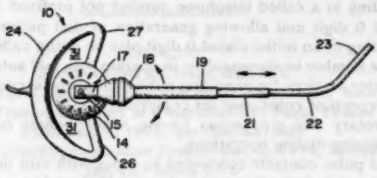
ADJUSTABLE HEADSET

S. Dan Brodie, 8210 Capwell Drive, Oakland, Calif. 94621

Filed Jan. 15, 1976, Ser. No. 649,462

Int. Cl.² H04M *1/05*

U.S. Cl. 179—156 A **2 Claims**



1. A headset for use with a human ear having an auditory meatus comprising a generally cylindrical housing having an interior, planar end disposed adjacent to the auditory meatus and an exterior end comprising a truncated cone coaxial with said housing; a pair of arms extending radially from said housing, a flexible, arcuate member joined to the distal ends of said arms, said arms, housing, and member defining a slot therebetween through which an ear is received; the entire extent of said arcuate member and said arms including a continuous groove therein; a first transducer disposed within said housing for directing sound into said auditory meatus, a transducer arm pivotally joined to said exterior end of said housing at the axis thereof, said transducer arm including a generally cylindrical portion having truncated conical ends, said cylindrical portion disposed substantially immediately adjacent to said housing; said transducer arm including a first section fixedly secured in the distal end of said cylindrical portion and formed of hollow rigid tubular material, a second hollow rigid tubular section telescopically and rotatably received in the distal end of said first section, and a third, flexible hollow tubular section fixedly secured to the distal end of said second section; a second transducer disposed within said cylindrical portion of said arm and communicating with the bores of said tubular sections: first lead wires extending from said second transducer through said transducer arm, said cylindrical housing, and said groove in one of said arms and a portion of said groove in said arcuate member, and second lead wires extending from said first transducer through said groove in the other of said arms and the remaining portion of said groove in said arcuate member.

4,020,298

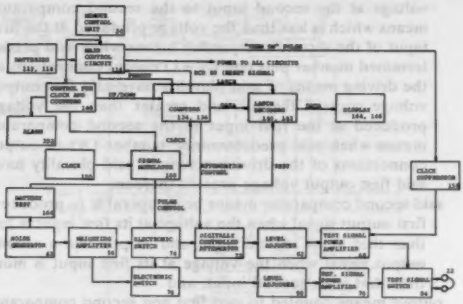
APPARATUS FOR TESTING ACOUSTICAL ATTENUATION OF HEARING PROTECTORS

John M. Epley; Austin F. Leach, and Arnold Frisch, all of Portland, Oreg., assignors to Hearing Evaluation & Acoustic Research, Inc., Portland, Oreg.

Filed Sept. 15, 1975, Ser. No. 613,224

Int. Cl.² H04R *29/00*

U.S. Cl. 179—175 **6 Claims**



3. An apparatus for generating an audio test signal of varying amplitude and displaying a numerical value variably responsive to said amplitude comprising:

a. signal generating means for generating an audio test signal of varying amplitude

b. two-position switch means coupled with said signal generating means for gradually decrementing the amplitude of said test signal in one position and gradually incrementing the amplitude of said test signal in the other position; and

c. display means coupled with said signal generating means for displaying automatically in response to the movement of said switch means, a numerical indication of the relative amplitude of said test signal at a point when said switch means moves from one position to the other.

4,020,299

ELECTRO-ACOUSTIC TRANSDUCER DIAPHRAGMS

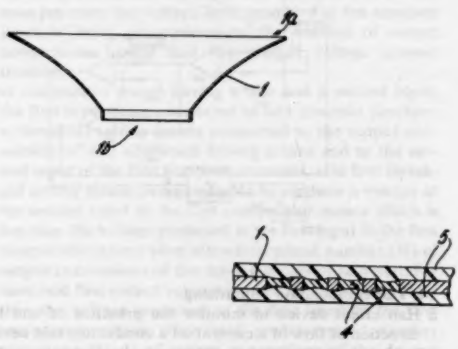
Alex Victor Garner, Leeds, and Graham Townsend, Shipley, both of England, assignors to The Rank Organisation Limited, London, England

Continuation-in-part of Ser. No. 479,495, June 14, 1974, abandoned. This application May 19, 1975, Ser. No. 578,916

Claims priority, application United Kingdom, June 16, 1973, 28732/73

Int. Cl.² H04R *7/02*

U.S. Cl. 179—181 R **8 Claims**



1. In an electro-acoustic transducer of the type having a diaphragm for the generation of sound and drive means for the diaphragm, and wherein said diaphragm is provided with

perforations filled with a damping material having a high level of internal energy absorption to oppose the formation of standing waves in the diaphragm,

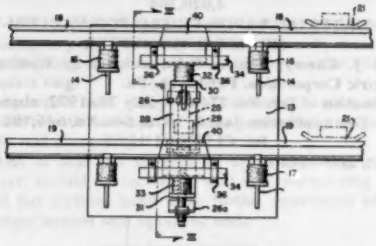
the improvement wherein said perforations are located in at least three equally spaced bands extending substantially radially with respect to a common central point and curved in the same direction, at least at the radially outer ends of the band, through a predetermined angle, and wherein the perforations in each band are located in a plurality of parallel rows extending along the length of the band.

4,020,300

SECTIONALIZED CRANE COLLECTOR SYSTEMS

Harry A. Nassif, Pittsburgh, Pa., assignor to Hanco, Inc., Pittsburgh, Pa.

Filed Sept. 25, 1975, Ser. No. 616,648
Int. Cl.² B60M *1/30*
U.S. Cl. 191—22 R **5 Claims**



1. In an electrical power rail system, a pair of aligned conductor rails spaced apart longitudinally to form an air gap and having upper surfaces for engagement by a current conductor movable along them a single bridging rail member of the same shape as said air gap and adapted to fit in said air gap flush with the top of said conductor rails, a parallel conductor means fixed to and parallel to said bridging rail and in electrical contact therewith to form an integral unit, said conductor means being longer than the air gap and extending beyond said bridging rail member, resilient conductor means on each aligned conductor rail adjacent the air gap releasably engaging the ends of said parallel conductor means, vertically movable carrier means adjacent said air gap simultaneously carrying said bridging rail member and said parallel conductor means vertically between a first position engaging said resilient conductor means in which the bridging rail member fills the air gap flush with the top of said aligned rails and a second position in which the parallel conductor means is out of engagement with said resilient conductor means and the bridging rail member is removed from the air gap, and drive means acting on said carrier means to move it selectively between said first and second position.

4,020,301

DRAWOUT APPARATUS HAVING IMPROVED SECONDARY CONTACT MOUNTING PROVISIONS

Eric Axel Ericson, Plainville, and Frederick Daniel Kaufhold, Forestville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,617
Int. Cl.² H01H *9/20*
U.S. Cl. 200—50 AA **10 Claims**

1. Drawout apparatus for racking an electrical device into and out of a compartment in an electrical enclosure, wherein the electrical device and the enclosure are equipped with mating primary disconnect contacts, said drawout apparatus comprising, in combination:

A. a carriage mounting the electrical device;

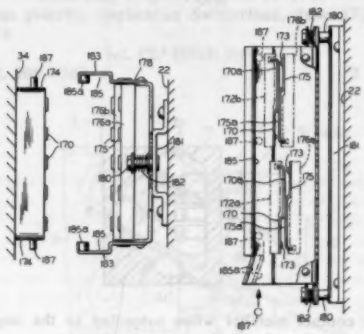
B. a rail assembly mounted to each compartment sidewall and supporting said carriage for movement between an extended position where the primary contacts are disengaged and an engaged position where the primary contacts are engaged;

C. means defining a test position for said carriage intermediate said extended and engaged positions;

D. a first plurality of individually flexibly mounted secondary contacts;

E. first means fixedly mounting said first plurality of secondary contacts en masse to one of said carriage and enclosure;

F. a second plurality of individually flexibly mounted secondary contacts;



G. second means floatingly mounting said second plurality of secondary contacts en masse to the other of said carriage and enclosure;

H. first guide means referenced to said first plurality of secondary contacts; and

I. second guide means referenced to said secondary plurality of secondary contacts, said first and second guide means interacting as said carriage is moved from said extended position to said test position to draw said second plurality of secondary contacts into individual electrical engagement with associated secondary contacts of said first plurality, and to maintain said electrical contacting engagement during movement of said carriage between said test position and said engaged position.

4,020,302

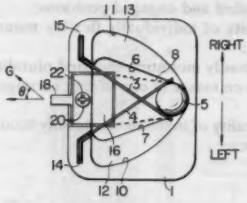
SENSOR HAVING SPRING BIASING STRUCTURE TO RETAIN CONDUCTIVE BRIDGING INERTIAL MASS IN A NON-OPERATIVE POSITION

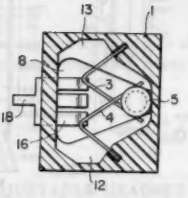
Akira Hasegawa, Katsuta; Takahiko Tanigami, Mito, and Kenichi Ushiku, Katsuta, all of Japan, assignors to Nissan Motor Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Filed Feb. 19, 1976, Ser. No. 659,253
Claims priority, application Japan, Feb. 21, 1975, 50-20923; June 30, 1975, 50-80017
Int. Cl.² H01H *35/14*
U.S. Cl. 200—61.45 R **10 Claims**

1. In a collision speed detecting sensor having a base structure which is formed with a predetermined space portion, at least one electric contact member which is arranged at one end of the space portion, a spring member which is situated within the space portion and whose one end is supported by the base structure, and a mass which lies within the space portion, which is normally restrained at an inoperative position by the spring member and which, when subjected to an impulsive force greater than a predetermined value, moves to an operative position against the spring member and touches the electric contact member, the improvement comprising a pair of spring means symmetric in shape to constitute said spring member, means to fix one end of each said spring means onto said base structure in such a manner that both said spring means intersect with each other between free ends and fixed parts thereof, and means to hold said mass in engagement with both said spring means in the vicinity of the inter-

secting portion of both said spring means while said intersecting portion moves with said mass toward said at least one





electric contact member when subjected to the impulsive force greater than the predetermined value.

4,020,303

POLYIMIDES PREPARED FROM AMINE TERMINATED PREPOLYMERS AND OLEFIN CONTAINING ANHYDRIDES

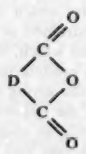
Richard J. Jablonski, Scotia, and Daniel Kruh, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 16, 1971, Ser. No. 208,929
Int. Cl.² C08G *73/10, 73/12*
U.S. Cl. 260—78 UA **9 Claims**

1. A polymer selected from (a) the reaction product of (1) amine terminated prepolymer prepared by reacting a material selected from dicarboxylic acid, dicarboxylic acid anhydride, tricarboxylic acid and tricarboxylic acid anhydride with simple polyamine having the formula

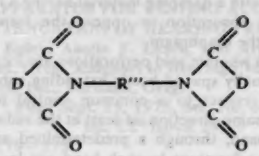
$$I \quad X—R''—NH_2)$$

where R'' is an organic radical, *n* is at least 2 and X is selected from hydrogen, amino group, substituted organic groups and unsubstituted organic groups and (2) simple olefin selected from the group consisting of



II

where D is an aliphatically unsaturated divalent organic radical and



III

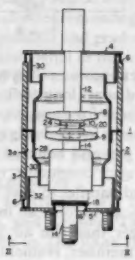
where R''' is a group containing at least two carbon atoms and D is as above, (b) the reaction product of (1) olefin terminated prepolymer prepared by reacting the amine terminated prepolymer of (a) above with simple olefin selected from the olefins of Formulas II and III above and (2) simple polyamine as in Formula I above, (c) the reaction product of amine terminated prepolymer as in (a) above and olefin terminated prepolymer as in (b), about equivalent proportions of the polymer forming reactants being used.

4,020,304

TWO-MATERIAL VAPOR SHIELD FOR VACUUM-TYPE CIRCUIT INTERRUPTER

Sidney J. Cherry, Elmira, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 274,699, July 24, 1972, abandoned. This application Jan. 6, 1976, Ser. No. 646,792
Int. Cl.² H01H *33/66*
U.S. Cl. 200—144 B **3 Claims**



1. A vacuum-type circuit interrupter including in combination:

a. means defining an evacuated envelope;

b. a pair of separable contacts disposed within the evacuated envelope and separable to establish arcing;

c. a vapor-condensing shield provided interiorly within said evacuated envelope to prevent the deposition of metallic particles emitted from the arcing region toward the outer casing of the envelope; and,

d. said vapor condensing shield being fabricated of two materials, a copper central shield portion about the arcing area, and opposed end shield portions at each end of the central shield portion formed of a metal having a higher breakdown voltage characteristic than copper, which metal is selected from the group of stainless steel, steel, nickel, Monel metal, and aluminum.

4,020,305

REMOTE ACTUATED SWITCH

Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.

Filed Aug. 25, 1975, Ser. No. 607,253
Int. Cl.² H01H *13/50*
U.S. Cl. 200—159 R **5 Claims**

1. A remote actuated switch comprising:

a housing;

a plunger movably mounted in said housing;

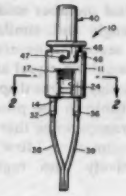
a contact ring at the end of said plunger for opening and closing said switch;

a spring for normally biasing said plunger to the switch open position;

said switch comprising a pair of contacts located in said housing opposite said contact ring;

a pair of external leads, one being attached to each of said contacts through which current flows when said contact ring is moved by said plunger against both said contacts;

each of said contacts comprising a flexible metal spring member having a flat section and an upturned end;



each contact being located over a separate cavity in said housing to permit bending of said contact by movement of said plunger after engagement of said contact with said contact ring;

said upturned ends being the first contact area of said contacts with said contact ring upon initial engagement with said plunger; and

portions of said flat sections of said contacts providing larger, second contact areas with said contact ring when said flat sections bend upon further movement of said plunger against said upturned ends.

4,020,306

HIGH VOLTAGE SWITCHING DEVICE WITH CALCIUM-ALUMINUM GLASS FILLED RESIN INSULATOR SUPPORT

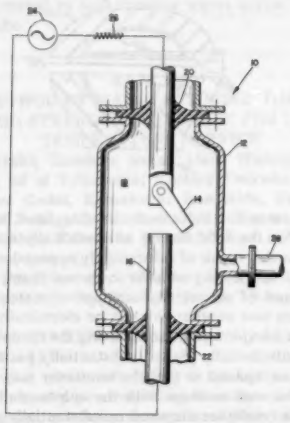
Hansruedi Zahner, Dreizelgenweg 22, CH-5036 Oberfelden, Switzerland, and Gerd Müller, Im Dorfgraben 43, 65 Maint-Laubenheim, Germany

Filed Dec. 3, 1974, Ser. No. 529,092

Claims priority, application Switzerland, Dec. 7, 1973, 17164/73

Int. Cl.² H01H *9/00, 33/00;* **C08L** *63/00*

U.S. Cl. 200—293 **12 Claims**



1. An electrical device comprising:

A. a container,

B. arc-prone electrical contacts within the container,

C. an arc-resistant, dielectric halogenated gas within the container,

D. a filled resin electrical insulator within the container in contact with the gas, said filled resin comprising:

1. a cured epoxy resin,

2. a filler of particles of calcium-aluminum glass wherein the glass is free of silicon, boron, and alkali metals.

4,020,307

COMPRESSED GAS ELECTRICAL SWITCH WITH GAS-TIGHT HOUSING

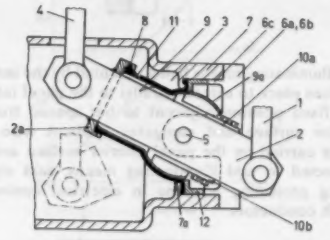
Harald Strübin, Fislisbach, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed June 5, 1975, Ser. No. 584,043

Claims priority, application Switzerland, June 17, 1974, 8246/74

Int. Cl.² H01H *9/04*

U.S. Cl. 200—302 **2 Claims**



1. In a compressed gas electrical switch structure, the combination comprising a housing and which includes therein a chamber filled with a pressurized gas, said housing being provided with a pass-through opening into said gas-pressurized chamber from the free atmosphere, a lever, said lever being pivotally mounted on intermediate its ends on said housing and extending through said pass-through opening, one end of said lever extending beyond said housing into the free atmosphere and which is connected to an operating rod and the other end extending into said gas-pressurized chamber and which is connected to a switch contact operating member, a sleeve surrounding said pivotally mounted lever and secured thereto, said sleeve including a cylindrical part which is closed at one end thereof within said gas-pressurized chamber and a spherically shaped part at the other end in contact with a complementarily configured part of said housing at said pass-through opening, a gasket of elastic material surrounding and in contact with said sleeve in said gas pressurized chamber, one end of said gasket being secured to the closed end of said sleeve so as to seal off that end of said sleeve from said gas-pressurized chamber and the other end of said gasket which overlies the spherical part of said sleeve being secured to said housing at said pass-through opening to seal off said gas-pressurized chamber from the outside.

4,020,308

COVER ASSEMBLY FOR AN ELECTRICAL SWITCH

Stanley H. Edwards, Jr., Weaverville, and Cleve L. Reese, Arden, both of N.C., assignors to Square D Company, Park Ridge, Ill.

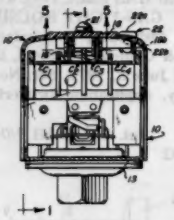
Filed Apr. 10, 1975, Ser. No. 566,944

Int. Cl.² H01H *9/16*

U.S. Cl. 200—310 **4 Claims**

1. A switching device comprising an electrical switch provided with a pair of relatively spaced conductors, and a removable cover assembly mounted on said switch and concealing said conductors, said cover assembly including a panel having exterior and interior surfaces, the interior surface being spaced from said conductors; a unitary lens piece mounted on said panel and having an outer portion engaging the panel exterior surface, an inner portion engaging the panel interior surface, and an intermediate portion extending

through an opening formed in said panel; said inner portion including and terminating in spaced gripping fingers, and being normally passable through said opening, illuminating means inserted and secured between and resiliently embraced by said gripping fingers, with the fingers being so spread by said inserted illuminating means as to so expand said inner portion as to preclude passage thereof through said opening,



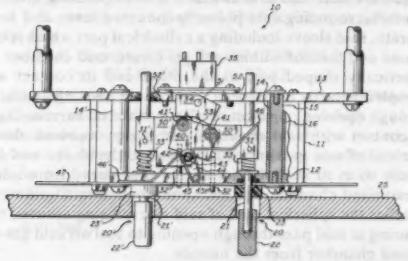
said illuminating means being mounted by the inner portion of said lens piece to extend parallel to the panel interior surface in a fixed position adjacent to but spaced from the panel interior surface and elongated resilient wire-like contact means carried on the panel interior surface and electrically connected to said illuminating means, said contact means having projecting portions in electrical contact with said switch conductors.

4,020,309

PUSHBUTTON SWITCH/ANNUNCIATOR FOR AIRCRAFT INSTRUMENTS

Donald Harder Leinweber, and Thomas Walter Neis, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,160
Int. Cl.² H01H 9/00
U.S. Cl. 200—314 **6 Claims**



1. In an aircraft instrument having an instrument face visible to the pilot of craft, apparatus for performing a desired switching function and providing a high contrast indication thereof comprising,

a supporting frame,

a first transversal member slidably supported by said frame and having an inner section within the apparatus and an outer section accessible to the pilot of the craft and extending from the face of said aircraft instrument,

a second transversal member slidably supported by said frame and having an inner section within the apparatus and an outer section accessible to the pilot of the craft extending from the face of said aircraft instrument,

switching means mounted to the frame forming a part of said apparatus having an actuating member pivotally secured thereto and coupled with the inner sections of said first and second transversal members such that with respect to the face of the aircraft instrument an ingression of said first transversal member results in an egression of said second transversal member and an ingression of said second transversal member results in an egression of said first transversal member and wherein said actuating member in response to the ingressions of said first and second transversal members actuates and restores respectively said switching means,

linking means coupled between said first and second transversal members such that in response to an ingression of said first transversal member said linking means rotates through a fixed angle and, similarly, in response to an ingression of said second transversal member said linking means rotates through an equal and opposite angle,

generally opaque display means disposed in the face of said instrument and visible to the pilot of the craft having a first and second transparency therethrough for indicating to the pilot the status of said first and second transversal members respectively with regard to said switching means, and

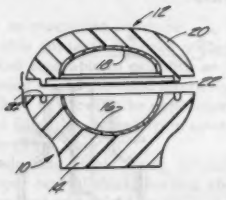
indicator means pivotally mounted to said frame having first and second flag members extending therefrom, said flag members having contrasting backgrounds thereon with respect to said first and second transparency and wherein said indicator means communicates with said linking means in a manner such that for an ingression of said first transversal member said first flag member is disposed immediately behind said first transparency providing a contrasting background therefor and simultaneously disposing said second flag member a substantial distance from said second transparency and, similarly, for an ingression of said second transversal member said second flag member is disposed immediately behind said second transparency providing a contrasting background therefor and simultaneously disposing said first flag member a substantial distance from said first transparency.

4,020,310

CONTAINER FOR INDUCTIVELY HEATING FOOD

James J. Souder, Jr., 630 Archwood, and Lindsey E. Waldorf, 3888 Loch Alpine Drive, both of, Ann Arbor, Mich. 48103

Filed Mar. 20, 1975, Ser. No. 560,396
Int. Cl.² H05B 5/08
U.S. Cl. 219—10.49 **9 Claims**



5. Apparatus for inductively heating food, comprising: a container for the food having an electrically non-conductive body supporting a pair of substantially opposed sections defining a food supporting volume between them, the sections being formed of electrically conductive material and being spaced from one another so as to be electrically insulated by the body; a compartment for receiving the container including a pair of substantially planar, substantially parallel separated wall sections, spaced so that the container may be supported between the wall sections with the substantially planar sections of the container disposed in substantially parallel alignment with the opposed wall surfaces; a pair of induction heating coils, one supported in each of the wall sections; and alternating electric current generating means connected to the two coils to cause them each to create a separate alternating electromagnetic field, which induces separate electric currents in the two substantially opposed sections of the con-

tainer whereby each section is independently heated by the current induced in the section.

4,020,311

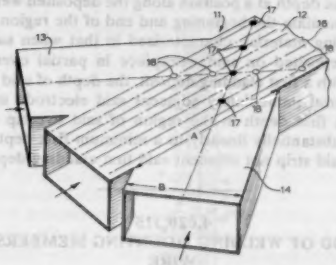
MICROWAVE POWER APPLICATOR

Mark T. Churchland, Burnaby, Canada, assignor to MacMillan Bloedel Limited, Vancouver, Canada

Filed Sept. 15, 1975, Ser. No. 613,454

Int. Cl.² H05B 5/00

U.S. Cl. 219—10.55 A **10 Claims**



1. Apparatus for applying microwave power to a workpiece comprising a first hollow tube having an inlet end and an outlet end, said first tube being adapted to receive through said inlet end a workpiece to which microwave power is to be applied, said workpiece passing through said first tube where microwave power is applied thereto and exiting through said outlet end; first and second hollow waveguide sections located on opposite sides of said first tube and communicating with said first tube to introduce microwaves into said first tube; and means for supplying microwaves to said first and second sections to the propagated through said first and second sections for introduction into said first tube; the frequency of said microwaves, the width of said first tube measured between said first and second sections and the angles of inclination of said first and second sections with respect to said first tube being chosen such that the peak amplitudes of reflection standing waves created by introduction of microwaves into said first tube via said first and second sections respectively are interleaved, thereby substantially uniformly distributing hot spots created by said standing waves across the width of said first tube.

4,020,312

METHOD OF MANUFACTURING THICK, HIGH-STRENGTH STEEL PIPE FOR LOW TEMPERATURE SERVICE

Mutsuro Araki; Bunshiro Sakai; Itaru Watanabe; Makoto Yamada, all of Yokohama; Koshiro Tsukada, Fukuyama; Tomokazu Godai, Kamakura; Isao Aida, Fujisawa, and Masatoshi Nakagaki, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo and Kobe Steel Ltd., Kobe, both of, Japan

Filed Nov. 21, 1975, Ser. No. 634,325

Claims priority, application Japan, Nov. 27, 1974, 49-135557

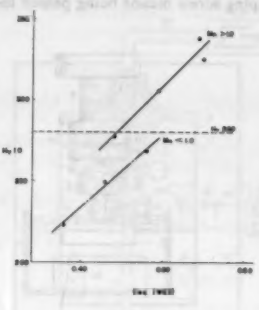
Int. Cl.² B23K 31/06, 9/16, 9/18, 35/34

U.S. Cl. 219—61 **4 Claims**

1. A method of manufacturing a thick, low-temperature high-strength steel pipe comprising the steps of:

a. forming into a tubular shape a steel plate having a thickness of over 12 mm and containing: C, 0.01 to 0.15%; Si, 0.02 to 0.50%; Mn, 0.1 to 2.0%, P, less than 0.020%; S, less than 0.020%; at least one element selected from the group consisting of Cu, Ni, Cr, Mo and W in an amount between 0.1 and 1.0% when selecting Cu, Cr, Mo and W, and, in an amount between 0.1 and 9.50% when selecting Ni; at least one element selected from the group consisting of Sol Al, Zr, Ti, V, Nb and B in a total amount between 0.005 and 0.20%, the remainder being Fe and unavoidable impurities, the carbon equivalent of said steel being so adjusted that said carbon equivalent is less than 0.50 when said Mn content is less than 1.0%, whereas said carbon equivalent is less than 0.45 when said Mn content is over 1.0%; and

b. welding said formed steel plate into a steel pipe by subjecting said steel plate to large-current gas shielded arc welding using at least one consumable electrode, one pass per electrode on each side of the seam of said formed steel plate, in an atmosphere of a mixed shielding gas consisting essentially of an inert gas and an active gas



selected from the group consisting of carbon dioxide in an amount less than 30% and oxygen in an amount less than 5% and supplied at an overall flow rate between 50 and 200 l/min wherein said consumable electrode comprises Ti in the range of 0.01 and 0.3%, has a diameter between 3.0 and 6.4 mmϕ operating at a welding current between 600 and 1500 amp, arc voltage between 23 and 36 volts and welding speed between 300 and 1500 mm/min;

and said steel pipe having, in the as-welded condition thereof, mechanical properties such that the yield point of the base metal portion of said steel pipe is over 60,000 psi and the weld zone of said steel pipe has a maximum hardness of less than Hv10-280 and a Charpy test absorbed energy of over 7 Kg.m at −10° F.

4,020,313

ADJUSTABLE ELECTRODE POSITIONING DEVICE FOR ELECTRIC SPARK MACHINING APPARATUS

Mamoru Koga, 9-5 Hon-Komagome 2-chome, Bunkyo, Tokyo, Japan (113), and Masanori Matsunobu, 24 Sakae-cho 1-chome, Matsudo, Chiba, Japan (271)

Filed Aug. 27, 1975, Ser. No. 608,221

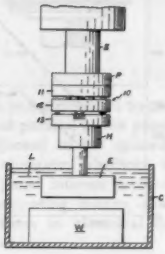
Claims priority, application Japan, Sept. 4, 1974, 49-101706

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 E **3 Claims**

1. In an adjustable electrode positioning device for use with electric spark machining apparatus comprising a first disc adapted to secure said device to a spindle of said apparatus, a second disc, and a third disc adapted to hold an electrode means, said first, second and third discs being coupled to each other in sequential aligned position along a center axis defined by said discs, the improvement comprising: (A) a first clamping screw means having a head disposed adjacent to the peripheral edges of said first and second discs, said first clamping screw means being passed loosely through a hole in said second disc and threaded into said first disc, said head being received together with a washer in a depression formed under the hole in said second disc, (B) a first adjusting means having a head positioned diametrically opposite to said first clamping screw means, said first adjusting means being passed loosely

through a hole in said second disc and threaded into said first disc, the head of said first adjusting means being received together with a washer in a depression formed under the hole in said second disc, a coiled spring being disposed about said first adjusting means between said first and second disc; (C) a pair of balls each in an upper and lower socket positioned symmetrically relative to said first clamping screw means on a line passing through a center of said first clamping screw means and a first line which passes through a center of each of said first clamping screw means and said first adjusting means; (D) a second clamping screw means having a head disposed adjacent to the peripheral edges of said second and third discs and on a second line which intersects perpendicularly with said first line at the center of said second and third discs, said second clamping screw means being passed loosely through a



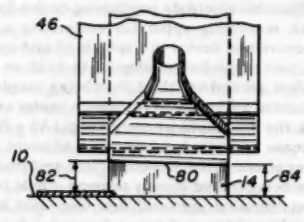
hole in said third disc and threaded into said second disc, the head of said second clamping screw means being received together with a washer in a depression formed under the hole in said third disc; (E) a second adjusting means having a head positioned diametrically opposite to said second clamping screw means, said second adjusting means being passed loosely through a hole in said second disc and threaded into said third disc, the head of said second adjusting means being received together with a washer in a depression formed in said first disc; a coiled spring being disposed about said second adjusting means between said second and third discs; and (F) a pair of balls each in an upper and lower socket positioned symmetrically relative to said second clamping screw means and on a third line passing through a center of said second clamping screw means and intersecting perpendicularly with said second line.

4,020,314

DELIVERY OF WELDING FLUX IN A METHOD OF SUBMERGED ARC STRIP CLADDING OF METALLIC WORK PIECES

John Joseph Barger, Ringgold, Ga., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed July 17, 1975, Ser. No. 596,877
Int. Cl.² B23K *9/18, 9/04*
U.S. Cl. 219—73 R **1 Claim**



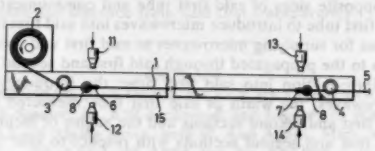
1. A method of submerged arc welding for cladding in which an electric arc is maintained between a consumable strip electrode and a workpiece to be clad, the arc being submerged in flux material, while the tip portion of said consumable strip electrode is being melted off and molten metal of said strip electrode is forming the cladding on the surface of said workpiece, there being a region immediately adjacent said electric arc wherein the deposited material is in a molten state, the depth of the molten metal in said region decreasing as the distance along the deposited material from said electrode strip increases, the molten material in turn being covered by a layer of molten flux which in turn is covered by a layer of unmelted welding flux material, and wherein the welding flux material is at a first depth immediately adjacent said electrode strip and increases substantially linearly to a second flux depth at a position along the deposited weld material intermediate the beginning and end of the region of molten cladding material, characterized in that when said cladding is deposited on said workpiece in partial overlapping fashion with a first cladding deposit, the depth of said welding flux material immediately adjacent said electrode strip is a maximum first depth in the region of said overlap and decreases substantially linearly to a minimum first depth at the edge of said strip not adjacent said first cladding deposit.

4,020,315

METHOD OF WELDING MOUNTING MEMBERS TO A WIRE

Reinhold Euler, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Germany

Continuation of Ser. No. 329,555, Feb. 5, 1973, abandoned. This application Aug. 23, 1974, Ser. No. 500,007
Claims priority, application Germany, Feb. 7, 1972, 2205602
Int. Cl.² B23K *11/10*
U.S. Cl. 219—91 **2 Claims**



1. A method of producing a corona discharge wire comprising disposing an electrically conductive wire of high tensile strength between two spaced mounting elements, each mounting element being bent to have two portions in spaced parallel relation surround said corona discharge wire which is passing through the middle of a securing hole provided in each mounting element, pre-stressing said discharge wire across clamping and tensioning points outside and beyond the mounting elements, said clamping and tensioning points being aligned with the mounting elements, and spot-welding said mounting elements to said discharge wire to form a solidified fused mass to include and to fix said discharge wire to the mounting elements.

4,020,316

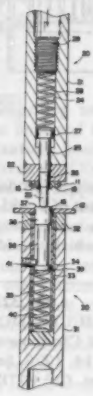
METHOD AND APPARATUS FOR POSITIONING NUTS TO BE WELDED TO A BASE

Edwin E. Schaft, Berea, and Kenneth A. Yeager, Olmsted Falls, both of Ohio, assignors to Fastener Industries Inc., Cleveland, Ohio

Filed Aug. 22, 1975, Ser. No. 606,873
Int. Cl.² B23K *11/02*
U.S. Cl. 219—103 **7 Claims**

1. A welding apparatus for positioning and welding a nut or the like on a base, comprising a pair of electrode assemblies having opposed contact faces and movable relative to one another between an inward welding position forming electrical welding contact therebetween through said base and said nut, and an outward position, one of said electrode assemblies

being adapted for welding contact with said base and the other electrode assembly being adapted for welding contact with said nut, said other electrode assembly having a central bore in its contact face, a nut carrying and locating member slidably received in said base and adapted to extend through and grip a nut positioned thereon, through frictional engagement preventing movement of said nut in an axial direction relative to said member, said member being movable between an outwardly extending nut receiving and carrying position and a retracted nut releasing position within said other electrode



assembly to accommodate welding contact between said electrode contact face and said nut when said nut is positioned by said member on said base, spring means urging said member to its extended position, whereby when said electrode assemblies move relatively toward one another said member is depressed against said spring means during positioning of said nut on said base until said member releases said nut from frictional engagement with said member as said nut is positioned on said base for contact by said contact face of said other electrode assembly.

4,020,317

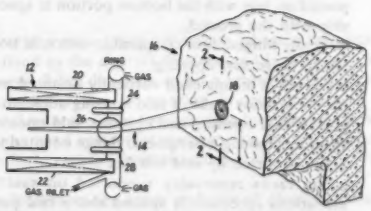
METHOD OF MINING ROCK WITH AN ELECTRON BEAM

Stirling A. Colgate, Socorro, N. Mex., assignor to New Mexico Tech Research Foundation, Socorro, N. Mex., a part interest

Continuation of Ser. No. 30,912, Dec. 10, 1971, abandoned. This application Nov. 13, 1974, Ser. No. 523,514

Int. Cl.² B23K *15/00*

U.S. Cl. 219—121 EM **7 Claims**



1. A method of breaking rock, comprising the steps of directing onto the surface of the rock an electron beam having an energy density of the order 2.5×10^9 watts/cm² to ablate the rock and produce an ablation pressure normal to the surface of the rock at the zone of impingement of the beam of from about 50,000 to 100,000 psi, such ablation pressure beng sufficient to fracture the rock, and magnetically deflecting the electron beam to move it across the rock surface at a velocity that is in phase with the speed of crack propagation in the rock, namely, about one-third of the dilatational wave speed in the rock.

4,020,318

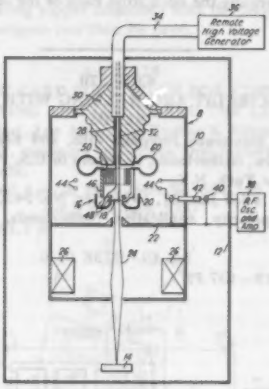
ELECTRON BEAM GENERATORS

Allan Sanderson, Balsham, England, assignor to The Welding Institute, Abington, England

Filed Jan. 24, 1975, Ser. No. 544,009

Int. Cl.² B23K *9/00*

U.S. Cl. 219—121 EB **16 Claims**



1. An electron beam generator system comprising a high voltage generator, an electron beam gun column having a longitudinal axis along which an emitted electron beam is directed, an oscillator for supplying an alternating voltage at a frequency of at least 2 kHz, an inductive coupling means connected to receive the output of the oscillator and comprising a primary coil and a secondary coil, at least the secondary coil being arranged concentrically around the electron beam gun column, the gun column including a cathode connected to the high voltage generator and the coupling means including an output coil so situated with respect to the cathode that when the output coil is energized by a high frequency current, a high frequency current is induced in the cathode and heats the cathode.

4,020,319

METHOD OF FORMING A KNITTING NEEDLE LATCH PIVOT

Richard Wilton Shepard, and Albert Sidney Ashmead, both of Torrington, Conn., assignors to The Torrington Company, Torrington, Conn.

Continuation-in-part of Ser. No. 440,459, Feb. 7, 1974, Pat. No. 3,934,109. This application Oct. 28, 1975, Ser. No. 625,837

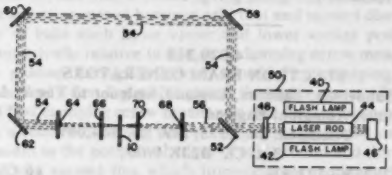
The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.

Int. Cl.² B23K *9/00*

U.S. Cl. 219—121 LM **3 Claims**

1. In a method of forming a latch pivot for a latch needle, having portions of the opposite walls of the slot in the needle displaced into a pivot hole of the latch with a space between the displaced portions and with spaces separating the latch from each of the opposite walls of the slot, the improvement comprising the steps of: simultaneously applying controlled heat from a high energy heat source against both displaced wall portions to at least melt a portion of said displaced wall portions so that molten metal is formed in the space between the two displaced wall portions; the extent of the molten metal

being controlled to substantially fill said space without contacting the latch and allowing the molten metal to solidify to



fuse the displaced wall portions together without changing the spaces separating the latch from each of the opposite walls of the slot.

4,020,320

SHORT-CIRCUIT ARC WELDING WITH CONSTANT BEADS

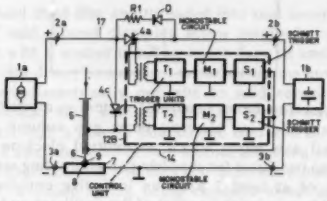
Hermanus Stephanus Josephus Pijls, and Elias Put, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 21, 1975, Ser. No. 542,840

Claims priority, application Netherlands, Feb. 8, 1974, 741723

Int. Cl.² B23K *9/10*

U.S. Cl. 219—137 PS **6 Claims**



1. A method of short-circuit arc welding using at least one electric supply source for the arc current and a consumable welding wire which method comprises, applying an electric voltage between the welding wire and a workpiece by means of the supply source while feeding the welding wire towards the workpiece during a first time interval T_b so that an electric arc is sustained between the welding wire and workpiece of substantially constant power thereby to develop a welding bead of substantially constant size, removing the energy supplied to the welding wire and workpiece while feeding the welding wire towards the workpiece during a second time interval T_w until the welding bead contacts the workpiece to produce a short-circuit, providing a constant delay time T_d following the moment of contact between the welding bead and workpiece, and applying a short-circuit current across the welding wire and workpiece at the end of said delay time so as to separate the welding bead from the welding wire.

4,020,321

ELECTRIC HEATERS

Roger Derek Oswald, Crawley, England, assignor to BOC Limited, Crawley, England

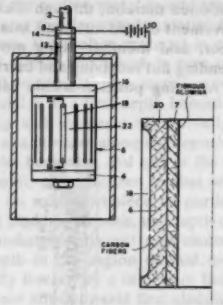
Filed Mar. 11, 1975, Ser. No. 557,368

Claims priority, application United Kingdom, Mar. 14, 1974, 11479/74

Int. Cl.² H05B *3/02*; F24H *1/10*; F28B *1/28*

U.S. Cl. 219—271 **15 Claims**

1. An element for an electrically energized vaporizer for liquid, including a body of electro-conductive material having one major face defining a liquid inlet and a second major face defining a vapor outlet which body is both thermally and chemically stable and is permeable by a liquid to be vaporized, said body being electrically energizable to heat and vaporize liquid as it flows from said liquid inlet face to said vapor outlet face, and means in the form of a plurality of blind recesses in said body open to said vapor outlet face for providing effective



escape routes for earliest produced vapor in said body whereby the entrainment of liquid in vapor issuing from said vapor outlet face is reduced compared with the amount of entrainment of liquid which would result if the escape route means were not present.

4,020,322

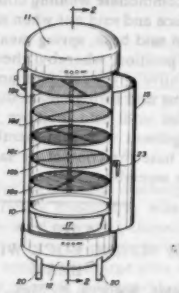
MULTI SMOKER

Edward T. Muse, 8514 Chadbourne, Dallas, Tex. 75209

Filed May 14, 1976, Ser. No. 686,299

Int. Cl.² F27D *5/00*

U.S. Cl. 219—392 **2 Claims**



1. A cooking device comprising:

a cylindrical housing having top and bottom closures permanently affixed, said housing having a longitudinal opening of about one-third the circumference thereof extending from about said top to about said bottom supported on legs with the bottom portion in spaced relationship with the ground,

a vertically hinged door cooperable with said housing member to close said opening,

three bracket means each vertically oriented and mounted on the interior walls of said housing adjacent to the margins of said opening and opposite said opening,

a water pan having a peripheral flange adapted to be removably supported by said bracket means,

cooking racks removably supported on said brackets at elevations successively spaced above said pan,

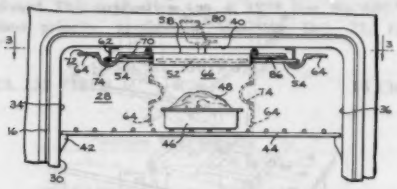
heating means including a resistance heating element disposed in said housing and supported from said bottom closure at an elevation above said bottom closure, said element having several spaced apart parallel sections, and

a removable tray supported by said bracket means adapted to support smoke generating material a predetermined distance above said element.

4,020,323
ENERGY SAVING BROILING OVEN

Raymond L. Dills, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Apr. 28, 1975, Ser. No. 571,982
Int. Cl.² H05B 1/02; A47J 37/00
U.S. Cl. 219—405 **10 Claims**

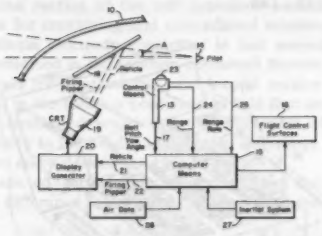


1. A broiling oven comprising an oven cooking cavity formed by a box-like oven liner and an access door, radiant heating means fixed substantially horizontally adjacent a top wall of the oven liner, an oven shelf for supporting food to be cooked thereon, and means for supporting the oven shelf in the top portion of the oven liner, below said heating means an adjustably mounted reflective means at each side of the heating means, each reflective means having a first downward position for forming with the other reflective means a miniature boiling compartment with relation to the said oven shelf and any food that may be placed thereon, so the food is adapted to be located between the two reflective means, and below said heating means the reflective means having a second raised position which enables the radiant heating means to radiate througout much of the oven cooking cavity.

4,020,324
WEAPON DELIVERY SYSTEM

Richard George Buscher, Woodland Hills, and Peter Eugene Carnevale, Canoga Park, both of Calif., assignors to Lear Siegler, Inc., Santa Monica, Calif.

Continuation-in-part of Ser. No. 500,531, Aug. 26, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,471
Int. Cl.² G06F 15/58; B64D 7/08
U.S. Cl. 235—61.5 S **2 Claims**



1. An aircraft weapon delivery system wherein the aircraft weapon is fixed to the aircraft fuselage and is pointed in the proper weapon firing direction to hit a target by aligning the fuselage in said direction, comprising, in combination:

a. a manual control means for operation by a pilot for generating command signals for maneuvering the aircraft fuselage in flight and for generating target line of sight information;

b. means for generating range and rate of change of range information of said target;

c. air data means for obtaining the velocity, angle of attack and side slip angle of said aircraft;

d. an inertial system for providing inertial attitude and accelerations of said aircraft;

e. display generating means including a display for observation by the pilot;

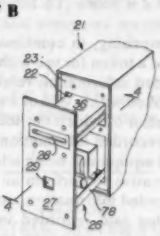
f. a display generator for projecting a reticle onto said display along with a firing pipper; and

g. computer means connected to the control means for actuating the aircraft flight controls in response to command signals generated by movement of the control means, said computer means passing said command signals directly to said display generating means to move said reticle without lag time to a registering position with a target viewed by said pilot, said computer means receiving said line of sight information, range and rate of change of range information, and being connected to the outputs of said air data means and inertial system and utilizing the information and outputs in the weapon delivery equations soled by the computer means, whereby the pilot can register and track the target with said reticle until the firing pipper coincides with the target at which time the weapon can then be fired.

4,020,325
MAGNETIC CARD SUBSTITUTE FOR COINS FOR STARTING APPLIANCES AND THE LIKE

Robert Fred Pfost, Los Altos, and Eugene S. Elkus, Atherton, both of Calif., assignors to Service Distributors, Inc., San Francisco, Calif.

Filed Apr. 2, 1975, Ser. No. 564,345
Int. Cl.² G06K 5/00
U.S. Cl. 235—61.7 B **27 Claims**

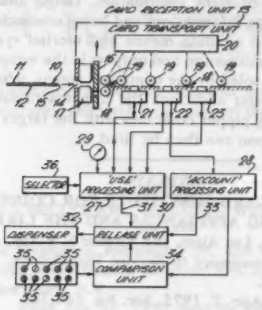


1. A reader for a card substitute for coins in actuating a machine, said card having a longitudinally extending magnetic strip encoded with one or more effective pulses, said reader comprising a casing having plates spaced apart in a longitudinally extending gap slightly greater than the thickness of said card and wide enough to receive said card, said casing having a front formed with a slot in registry with said gap and dimensioned to receive said card, a reversible motor in said casing, a first and second shaft each resiliently mounted transversely and parallel to said plates, a first and second roller each fixed to one of said shafts and extending into said gap to grip and transport a card inserted into said slot through said gap, a first switch in said casing having first switch actuating means extending into said gap positioned to be actuated by the leading edge of a card inserted into said slot to actuate said first switch to energize said motor in a first direction, first drive means interconnecting said motor and said first shaft, second drive means driving said second shaft from said first shaft in a direction opposite said first shaft, a second switch having second switch actuating means extending into said gap a fixed distance inward of said first switch actuating means positioned to be actuated by the leading edge of said card when it has been moved by said rollers into said gap a fixed distance to actuate said second switch to reverse said shafts, a transducer head in said casing positioned along the path of movement of said strip to read pulses on said card and to erase pulses and electrical circuitry for said head to count the pulses on said strip as said card moves inward and then count down the pulses on said strip as said card moves outward, erase one pulse and energize a relay, said circuitry including an up/down counter, a "skip one down pulse" function, and an "erase" function, arranged so that said counter is not actuated in an up direction by the first pulse on said strip as said strip moves inward and the last pulse on said strip is erased as said strip moves outward, said relay adapted to energize said machine.

4,020,326
TOKEN-CONTROL

Ian James Coulthurst, Maidenhead, England, assignor to Chubb Integrated Systems Limited, London, England

Filed Jan. 20, 1975, Ser. No. 542,624
Claims priority, application United Kingdom, Jan. 21, 1974, 02699/74
Int. Cl.² G06F 7/04; G06K 5/00
U.S. Cl. 235—61.7 B **18 Claims**



1. In a system comprising, in combination, equipment for receiving a token, and a token for use with the equipment, said token bearing recorded information relating to the extent of previous use of the token within one of a succession of periods of time throughout each of which the token is authorized for limited use, and the recorded information also including time-identifying data, said equipment being adapted to receive said token and being operative to perform an operation in dependence upon said recorded information, said equipment including means for reading said recorded information from the token, means for providing reference signals defining a current epoch in time, means for comparing the time-identifying data read from the token with said reference signals, and means for updating the said informatiion recorded on the token in dependence both upon the said operation performed by the equipment and the result of the said comparison between the time-identifying data read from the token and the said reference signals, the improvement wherein the time-identifying data recorded on the token defines the commencement of the authorized-use period which is next to commence following the last use of the token, and the said equipment includes means for up-dating the record of said time-identifying data on the token when the result of said comparison signifies that the next period-commencement is not later than the current time identified by the reference signals.

4,020,327
APPARATUS FOR READING OPTICAL CODES

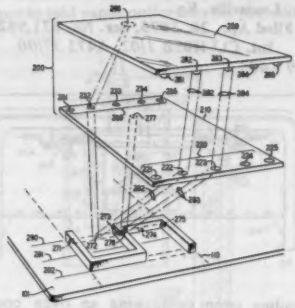
John Michael Geary, Laurence Harbor, and Hans George Mattes, Ocean Township, Monmouth County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 30, 1976, Ser. No. 653,753
Int. Cl.² G06K 7/10, 9/00, 9/04
U.S. Cl. 235—61.11 E **15 Claims**

1. Apparatus for scanning data optically encoded along a track on a record medium, comprising:

a first planar assembly including a linear array of radiant energy transmitting elements and a single detector element;

a lens assembly including (a) a first integral array of lenses each for focusing energy from an associated one of said elements on a particular point on said medium, each of said points forming a line transverse to said track, and (b) a second integral array of lenses each for focusing energy reflected from an associated one of said points on said detection element; and

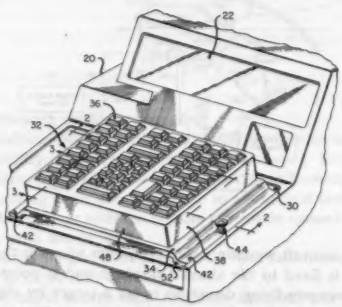


means for sequentially energizing said transmitting elements to scan said encoded data along said line.

4,020,328
AUXILIARY KEYBOARD APPARATUS

William R. Bradam, Cambridge, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 16, 1975, Ser. No. 641,411
Int. Cl.² G06C 7/02
U.S. Cl. 235—146 **19 Claims**



1. An auxiliary keyboard apparatus adapted for mounting on a business machine keyboard having key members therein, the auxiliary keyboard apparatus comprising

a. means for slidably supporting a plurality of key means on the keyboard wherein the key means are operatively associated with the key members for actuation thereof;

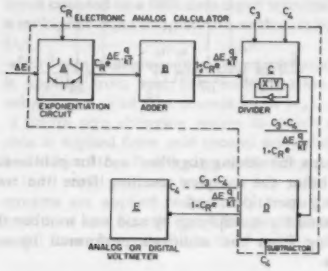
b. and means carried by said supporting means and engaging the keyboard when mounted thereon for sealing the key members from any liquids however deposited on said keyboard.

4,020,329

APPARATUS FOR RADIATION DOSE MEASUREMENT

Victor Eric Church, Engadine; Herbert James Fraser, Bulli, and Ralph William Matthews, Georges Hall, all of Australia, assignors to Australian Atomic Energy Commission, Coogee, Cliffbrook, Australia

Continuation-in-part of Ser. No. 300,407, Oct. 20, 1972, abandoned. This application Aug. 4, 1975, Ser. No. 601,704
Claims priority, application Australia, Oct. 21, 1971, 6741/71
Int. Cl.² G01V 1/28
U.S. Cl. 235—151.3 14 Claims



1. Apparatus for direct measurement of total radiation dose from the difference in electrochemical potential between an unirradiated solution containing known concentrations of ceric and cerous ions and a gamma irradiated solution initially containing the same known concentrations of ceric and cerous ions comprising:

a. a cell;
b. a removable container for transporting the irradiated ceric and cerous ions solution to the cell;
c. means integral with the cell, for drawing the irradiated solution into the cell;
d. a first section of the cell for drawing thereinto the irradiated solution;
e. a platinum electrode positioned in the first section of the cell such that when the first section of the cell contains solution the electrode is immersed;
f. a second section of the cell contained within the first section for containing said unirradiated solution;
g. a platinum electrode positioned in said second section and immersed in the solution contained therein;
h. a porous frit contained in said second section and immersed in the solution contained in said first section;
i. means connected across said two electrodes of the cell responsive to the produced potential difference between the two said solutions; and
j. automatic converting means for converting the said potential difference into a total radiation dose reading.

4,020,330

DENSITOMETER

Hyung Du Bae, Brea, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed May 3, 1976, Ser. No. 682,494
Int. Cl.² G01F 15/02; G06F 7/38
U.S. Cl. 235—151.3 4 Claims

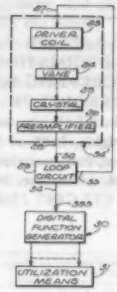
1. A densitometer comprising: a probe assembly having a structure to be vibrated while immersed in both a calibration fluid i and a fluid of use j different from said fluid i; a loop circuit connected from and to said probe assembly forming an electromechanical oscillator therewith, said loop circuit having an output lead and first means for producing a rectangular wave thereon of a predetermined frequency directly proportional to the vibrational frequency of said structure, said predetermined frequency being the reciprocal of the period T_i for a density d_i of said fluid i in a first equation,

$$d_i = A_i T_i^3 - B_i$$

where A_i and B_i are constants, said predetermined frequency being the reciprocal of the period T_j for a density d_j of said fluid j in a second equation,

$$d_j = A_j T_j^3 - B_j$$

where A_j and B_j are constants, said first and second equations accurately defining said densities d_i and d_j as functions of said periods T_i and T_j, respectively; second means actuable to



produce an output signal ΔT_i which is a function of the pressure of said fluid i; and computer means for solving a third equation,

$$d_i = A_i(T_i - \Delta T_i)^3 - B_i$$

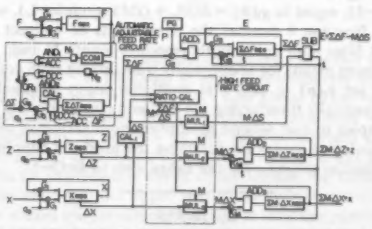
for d_j as a function of T_i and ΔT_i and to produce an output signal d_j which is effectively the same as said d_j term in said second equation.

4,020,331

FEED RATE CONTROL SYSTEM FOR NUMERICAL CONTROL MACHINE TOOL

Toshihiro Kimura, Nagoya, and Yasumasa Narikiyo, Aichi, both of Japan, assignors to Okuma Machinery Works Ltd., Nagoya, Japan

Filed Feb. 19, 1976, Ser. No. 659,586
Claims priority, application Japan, Aug. 30, 1973, 48-97718
Int. Cl.² G05B 19/18
U.S. Cl. 235—151.11 2 Claims



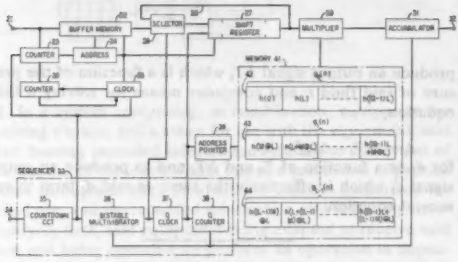
1. A feed rate control system for a numerical control system having a circuit to produce a unit movement quantity ΔS and a unit feed rate ΔF, a circuit to accumulate the unit feed rate ΔF at each pulse of the pulse generator and to store them, and a circuit to compare the output numerical value $\Sigma\Delta F$ of the storage circuit with the unit movement quantity ΔS and to produce an accumulating signal t whenever said $\Sigma\Delta F$ is larger than said ΔS, said accumulating signal controlling t the feed rate of the machine tool, which is provided with a high feed rate circuit comprising: a ratio calculator RATIO CAL to obtain the ratio M of said output numerical value $\Sigma\Delta F$ to said unit mivement quantity ΔS; and multipliers MUL_1, MUL_2, and MUL_3 to multiply said unit movement quantity ΔS, a Z-axis increment ΔZ of said unit movement quantity ΔS and a X-axis

increment ΔX, respectively, by said ratio calculator output M, wherein the output M·ΔZ of said multiplier MUL_2 and the output M·ΔX of said multiplier MUL_3 are added to the corresponding contents of a Z-axis drive register $\Sigma M\Delta Z_{REG}$ and a X-axis drive register $\Sigma M\cdot\Delta X_{REG}$ register, respectively, in response to the accumulating signal t which is generated when the output E of a subtractor SUB is in the condition E = ΣΔF − M·ΔX O, the subtractor serving to subtract the output M·ΔS of said multiplier MUL_1 from said output numerical value ΣΔF.

4,020,332
INTERPOLATION-DECIMATION CIRCUIT FOR INCREASING OR DECREASING DIGITAL SAMPLING FREQUENCY

Ronald Eldon Crochiere, Chatham, and Lawrence Richard Rabiner, Berkeley Heights, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 24, 1975, Ser. No. 616,283
Int. Cl.² G067 *15/34*
U.S. Cl. 235—152 **9 Claims**



1. Apparatus for converting the sampling rate of a digital input signal from f_r to (L/m) $)f_r$, where L and M are integers, comprising

means for storing Q consecutive samples of said input signal where Q is a predetermined integer;

multiplier means having first and second input terminals for supplying an output signal which is the product of the signals applied to said first and second input terminals;

coefficient storage means for storing L sets of coefficients, $g_i(n)$, i=0, 1, . . . , (L-1), each of said L sets of coefficients having Q elements with the k^{th} element, k=0, 1, . . . , (Q−1), equal to $g_i(k) = h(kL + (iM)$ modules L), where the function h denotes the coefficients of a direct form FIR filter with unit sample response length N and;

sequencer means for sequentially transferring each coefficient set $g_i(n)$ to said first multiplier input terminal and sequentially transferring each of said consecutive Q input samples to said second multiplier input terminal; and

accumulation means for summing the products supplied by multiplier means over the range k=0 to k=Q−1.

4,020,333
DIGITAL FILTER FOR FILTERING COMPLEX SIGNALS

Henri J. Nussbaumer, LaGaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 10, 1976, Ser. No. 665,474
Claims priority, application France, May 6, 1975, 75.00065150
Int. Cl.² G06F *7/38, 15/34*
U.S. Cl. 235—156 **35 Claims**

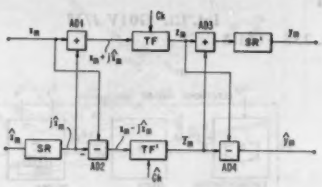
1. Digital filter for filtering complex signals, of the type which is fed with samples of the real and imaginary components of the signal to be filtered and provides separately the components of the filtered signal, characterized in that it includes:

first means for multiplying by j, the −1, said samples of said imaginary component of the signal to be filtered in a system wherein j is represented by a real number;

second means for adding said samples of said real component to those of said imaginary component multiplied by said real number;

third means for subtracting the samples multiplied by said real number from those of the real component;

fourth means for passing separately the signals supplied by said second and third means through transversal filtering means;



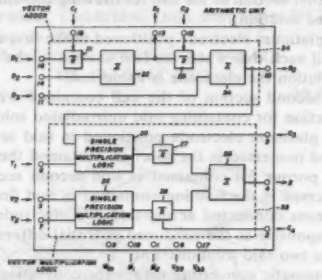
fifth means for adding together and for subtracting from each other the samples resulting from the transversal filtering operations; and

sixth means for multiplying by said real number the terms resulting from the additions performed by said fifth means.

4,020,334
INTEGRATED ARITHMETIC UNIT FOR COMPUTING SUMMED INDEXED PRODUCTS

Noble R. Powell, Syracuse, and John M. Irwin, Clay, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Sept. 10, 1975, Ser. No. 611,923
Int. Cl.² G06F *7/48, 15/34*
U.S. Cl. 235—164 **13 Claims**



1. An arithmetic unit suitable for large scale integration for computing summed indexed products comprising:

1. a vector adder for bit serial, word serial binary data containing sign and magnitude information, comprising:

a. a first sign changing means to which serial binary data is applied from a first data input terminal (d_1) and subject to a first sign control input (c_1),

b. a first serial summer to which two serial binary data streams are applied respectively from the output of said first sign changing means and from a second data input terminal (d_2), said summer producing a first output quantity (s_1) where

$$s_1 = (d_2 \pm d_1)$$

c. a second sign changing means to which serial binary data is applied from said first summer and subject to a second sign control input (c_2),

d. a second serial summer to which two serial binary data streams are applied respectively from the output of said

second sign changing means and from the output of a third data input terminal (d_3), said summer producing a second output quantity (s_2), where

$$s_2 = [d_3 \pm (d_2 \pm d_1)]$$

2. a vector multiplication logic for bit serial, word serial binary data, containing sign and magnitude information, comprising

a. first multiplication means having a multiplicated input coupled to the output of said second serial summer and a multiplier input coupled to a fourth data input terminal (t_1),

b. second multiplication means having a multiplicated input coupled to a fifth data input terminal (v_2), and to a multiplier input coupled to a sixth data input terminal (t_2),

c. a third sign changing means to which serial binary data is applied from said first multiplication means and subject to a third sign control input (c_3),

d. a fourth sign changing means to which serial binary data is applied from said second multiplication means and subject to a fourth sign control input (c_4),

e. a third serial summer to which two serial binary data streams are applied respectively from the outputs of said third and fourth sign changing means, said third serial summer producing a third output quantity:

$$\left\{ \underset{f(c_4)}{\pm t_2} \; \underset{f(c_3)}{v_2} \pm \underset{f(c_2)}{t_1} \; \underset{f(c_1)}{[d_3 \pm (d_2 \pm d_1)]} \right\}$$

wherein the first sign selection in the expression is dependent on c_4,

the second sign selection is dependent on c_3

the third sign selection is dependent on c_2, and

the fourth sign selection is dependent on c_1.

4,020,335

MULTI COLORED LIGHT SIGNAL FOR VEHICLES

Peter J. Bisceglia, 1901 McBain Ave., San Jose, Calif. 95125

Filed July 23, 1975, Ser. No. 598,373

Int. Cl.² B60Q *1/00*; F21L *11/00*

U.S. Cl. 240—7.1 R **5 Claims**

1. an antenna type light for a vehicle comprising:

1. a tubular shaft having one end adapted to be secured to a vehicle;

2. a clear plastic tube mounted on the upper end of said tubular shaft in axial alignment therewith;

3. incandecent lamp means arranged within said clear plastic tube;

4. an electrical circuit including a source of electrical energy connected by electrical conductive wires to said incandecent lamp means and controlled by a manually operated switch for illuminating said lamp;

5. a plurality of light diffusing translucent bodies mounted on and circumscribing said clear plastic tube in tandum relation one upon the other;

6. a separate thin sheet of colored film wrapped around said clear plastic tube between the latter and each of said translucent bodies for coloring the light emitting from said lamp means for illuminating each of said translucent bodies in a different color; and

7. opaque means on said clear plastic tube between each of said translucent bodies thereon for preventing blending of the different colors therebetween upon illumination of said lamp means.

4,020,336

VEHICULAR FOG HEADLIGHT

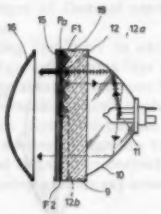
Ernst Linder, Muhlacker, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 1, 1975, Ser. No. 618,415

Claims priority, application Germany, Oct. 24, 1974, 2450456

Int. Cl.² F21V *9/00*; F21M *3/04*

U.S. Cl. 240—9.5 **9 Claims**



1. Vehicular fog headlight comprising a reflector (10) and a light source (11) located at least approximately at the focal point of the reflector to project light ahead of the vehicle and providing a distance beam directed to illuminate the region substantially in advance of the vehicle; wherein means are provided to direct light emanating from the lower half of the reflector immediately ahead of the vehicle; the distance beam is derived from the upper half of the reflector; and polarization means are provided polarizing at least the part of the light projected from the upper half and forming said distance beam.

4,020,337

ORNAMENTAL BUBBLE LAMP

Victor H. Chatten, 1567 W. 215th St., Torrance, Calif. 90501

Filed Jan. 8, 1976, Ser. No. 647,556

Int. Cl.² A47G *33/16*

U.S. Cl. 240—10 A **20 Claims**

1. In an ornamental device, the combination of: an upward extending tube containing a liquid and having a vapor space at its upper end, at least a portion of the tube being transparent, means for heating the liquid in a lower portion of the tube to

cause bubbles to form and to ascend in the liquid, and additional heating means within and at spaced intervals along the

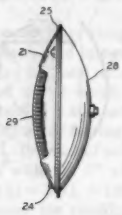
length of the tube to preserve the vapor state of the ascending bubbles and prevent their condensation.

4,020,338

AUTO HEADLIGHT LENS SHIELD

Norton M. Kirsch, Chicago, Ill., assignor to Auto Gard, Inc., Chicago, Ill.

Filed June 16, 1975, Ser. No. 586,869
Int. Cl.² F21V *11/16*
U.S. Cl. 240—46.53 **4 Claims**



1. A headlight lens shield comprising a convex base plate having a reflective inner surface shaped and dimensioned to fit over the front lens of a circular sealed beam headlight, the outer periphery of the shield being an offset rim step fitting behind and held in place by the rim or door surrounding said headlight, and a rectangular front opening in said shield for passing light transmitted through the headlight lens, the diagonal of said rectangular opening approaching the diameter of said headlight and the area of said rectangular opening being a substantial portion of the area of the circular lens of said sealed beam headlight.

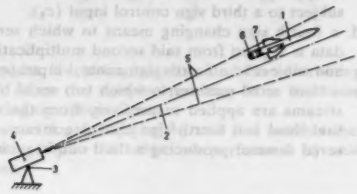
4,020,339

SYSTEM FOR DETERMINING THE DEVIATION OF AN OBJECT FROM A SIGHT LINE

Kjell Arne Håkan Gustafson, Karlskoga, Sweden, assignor to Aktiebolaget Bofars, Bofors, Sweden

Filed May 19, 1975, Ser. No. 578,977
Int. Cl.² G05B *1/00*
U.S. Cl. 250—202 **15 Claims**

1. A system for determining the deviation of an object from a reference line originating and extending from a reference point distant from the object, comprising a transmitter assembly located at said reference point and including a radiation beam projecting device for emitting a radiation beam in the direction of the reference line, said radiation beam projecting device being operative to produce in a plane at right angles to the reference line a radiation pattern composed of two elongated narrow strips of radiation which are mutually at right angles and which sweep alternatingly and periodically with a predetermined sweeping frequency f_s over said reference line in a direction at right angles to their respective longitudinal directions; and a receiver assembly located in said object and including a radiation detector activated by said radiation beam to generate an electric output signal modulated in response to the movement of said strips relative to the radiation detector, and signal processing circuits responsive to said output signal for evaluating the position of the object relative to the reference line, said signal processing circuits including



an automatically reversing first pulse counter driven by a clock pulse series and having a counting capacity of N_1 and adapted to be reset on the starting of the operation of the system in response to a signal from the transmitter assembly when a predetermined radiation strip is in a predetermined position relative to the reference line, said clock pulse series having a frequency f_k complying with the condition

$$f_k = 2KN_1 f_s$$

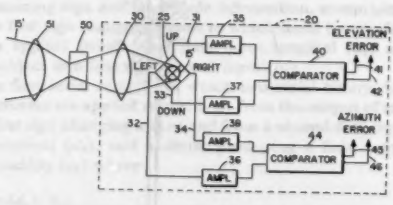
where K is an integer corresponding to the number of times, during a complete sweeping cycle for the radiation strips, that the reference line is passed over by a radiation strip, and registering means for registering, in response to the output signal from the radiation detector, the count in said first counter each time a radiation strip passes over the radiation detector.

4,020,340

PRECISION AUTOMATIC TRACKING SYSTEM

Claude R. Cooke, San Jose, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.

Continuation of Ser. No. 126,664, March 22, 1971, abandoned. This application Aug. 11, 1975, Ser. No. 603,601
Int. Cl.² G01J *1/20*
U.S. Cl. 250—203 R **1 Claim**



1. An automatic system for optically tracking a remote target in the atmosphere comprising

an optical transmitter adapted to generate optical pulses,

means for directing said pulses as a beam through the atmosphere to said target for reflection therefrom, the energy intensity distribution in said pulses being subjected to

substantial changes during transmission through the atmosphere due to variations in optical characteristics of the media comprising the atmosphere whereby the reflected pulses are characterized by atmospherically induced variations of spatial energy intensity distribution (scintillation),

a receiver having a photosensitive transducer with a plurality of electrically separate segments symmetrically arranged about the transducer axis, each segment being responsive to the magnitude of photon energy in said reflected pulses and producing an electrical output proportional to said energy,

means for comparing the outputs of said segments for deriving a tracking error signal when the optical axis of the reflected pulse beam is displaced from the transducer axis,

means for compensating for said scintillation in the received reflected pulses comprising

an optical diffuser located in the path of the received pulses adjacent to and on the input side of said transducer for diffusing said received pulses prior to incidence upon said transducer whereby to reduce the effect on said transducer of scintillation in said reflected pulse beam, and

a reducing lens adjacent to the optical input side of said diffuser for reducing the area of incidence of the reflected pulse beam on said diffuser.

4,020,341

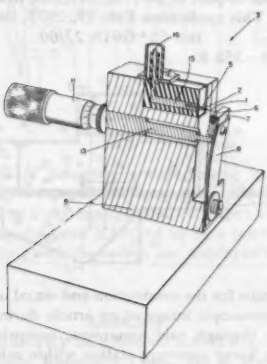
GENERATING AND USING COHERENT OPTICAL RADIATION

Ali Javan, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 389,970, Aug. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 62,380, Aug. 10, 1970, Pat. No. 3,755,678. This application Sept. 11, 1975, Ser. No. 612,264

Int. Cl.² H01J *39/12*

U.S. Cl. 250—211 J **25 Claims**



1. A method for generating coherent optical radiation comprising providing an antenna connected to a metal-to-metal diode junction having non-linear characteristics, and coupling to said diode junction an input of electromagnetic energy sufficient to interact with said junction to cause generation of current through said junction, causing flow of said current in said antenna, and causing resultant emission of coherent radiation from said antenna, said current and radiation being of an optical frequency which is dependent upon the frequency of said input and absent from said input.

4,020,342

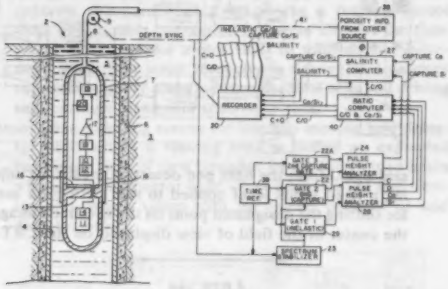
EARTH FORMATION SALINITY BY COMPARISON OF INELASTIC AND CAPTURE GAMMA RAY SPECTRA

Harry D. Smith, Jr., and Ward E. Schultz, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,230

Int. Cl.² G01V *5/00*

U.S. Cl. 250—270 **10 Claims**



1. A method for measuring the salinity of earth formations in the vicinity of a well borehole, comprising the steps of:

repetitively irradiating the earth formations in the vicinity of a well borehole with relatively short duration bursts of high energy neutrons;

detecting and counting gamma rays attributable to the inelastic scattering of fast neutron by carbon, oxygen, silicon and calcium, essentially only during said repetitive neutron bursts;

detecting and counting essentially only during the time interval between said neutron bursts, gamma rays attributable to the capture of thermal neutrons by calcium, chlorine and silicon;

detecting and counting just prior to each such repetitive neutron burst background gamma rays attributable to the capture of lingering thermal neutrons from a prior neutron burst and subtracting counts representative of such background gamma rays from counts representative of inelastic neutron scattering gamma rays from carbon, oxgyen, silicon and calcium to correct such representative inelastic scattering gamma ray counts for such background; and

comparing said inelastic scattering counts attributable to silicon and calcium with said capture gamma ray counts attributable to silicon, chlorine and calcium as a function of earth formation porosity to derive an estimate of the salinity of earth formations in the borehole vicinity.

4,020,343

SCANNING ELECTRON DEVICE

Takashi Shimaya; Takao Namae, and Kazuo Ishikawa, all of Tokyo, Japan, assignors to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 21, 1976, Ser. No. 678,770

Claims priority, application Japan, Apr. 23, 1975, 50-49441; Oct. 1, 1975, 50-118562

Int. Cl.² H01J *37/26*

U.S. Cl. 250—311 **6 Claims**

1. An apparatus for changing the field of view of a specimen in a scanning electron beam device comprising:

means for irradiating the specimen surface with the primary electron beam,

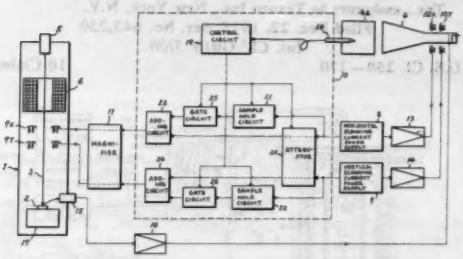
means for generating scanning signals,

means responsive to the scanning signals for deflecting the primary electron beam over the specimen,

means for detecting emissions from the specimen and providing an output signal indicative thereof,

CRT display means responsive to the scanning signals and the detecting means output signal for displaying a scanning image,

the improvement comprising a light pen detecting means for designating a point on the scanning image and creating a signal indicative of said point and means responsive to



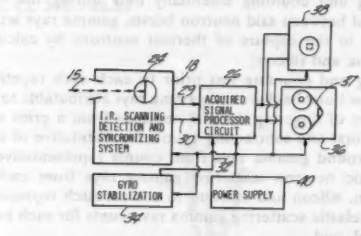
said signal from the light pen detecting means for adjusting a fixed signal level applied to said deflection means for shifting the designated point on the specimen image to the center of the field of view displayed on the CRT.

4,020,344

MOBILE INFRARED APPARATUS FOR MAPPING THERMAL VARIATIONS AND METHOD EMPLOYING SAME

Richard Lynn Kerschbaum, Ann Arbor, Mich., assignor to Daedalus Enterprises, Inc., Ann Arbor, Mich.

Filed July 7, 1975, Ser. No. 593,208
Int. Cl.² G01J *1/02*
U.S. Cl. 250—330 **16 Claims**



1. The method of detecting and correcting for heat loss in a ground-located structure comprising viewing a thermal ground scene in elevation by scanning said scene along vertical scan lines by means of a thermal detector while simultaneously moving said detector horizontally along said scene to acquire thermal data along vertically adjacent scan lines in a non-raster scan manner so as to provide continuous panoramic coverage of said scene in a horizontal direction corresponding to the horizontal movement of said detector, locating radiation anomalies in said data representing likely areas of high heat loss, physically examining that ground-based structure corresponding to an anomaly so located to confirm the presence or absence of high heat loss and then repairing those portions of said structure where high heat loss has been so confirmed.

4,020,345

DETECTOR FOR AN INFRARED ANALYZER

Emilio G. Meyer, Rozzano (Milan), Italy, assignor to Leeds & Northrup Italiana S.p.A., Milan, Italy

Filed Oct. 22, 1975, Ser. No. 624,654
Claims priority, application Italy, Oct. 22, 1974, 28656/74
Int. Cl.² G01N *21/26*
U.S. Cl. 250—343 **9 Claims**

1. A detector for use in an IR-ray analyzer of the type particularly adapted for detecting the presence and the concentration of a specific component in a liquid or gaseous sample and wherein the analyzer includes a source of radiant energy adapted to direct a radiations beam onto a sample to be analyzed and a detector for collecting radiations beam downstream of a sample and for supplying a measure of the concentration of a component which is searched for in the sample undergoing the analysis as a function of the IR-frequemcy quantity absorbed by a component during the flow of the radiations beam through a sample, said detector comprising an outer casing having reflecting inner walls, a transparent window formed in said casing for the flow of a radiations beam emerging from a sample being analyzed, an inner body having reflecting outer walls and positioned within said casing, said inner body defining a first chamber having an inlet

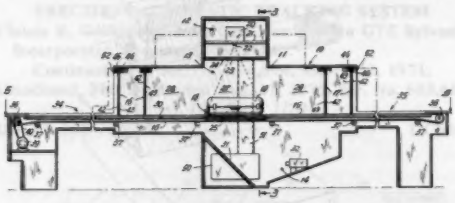
confronting said window, said inner body also defining a second chamber having an inlet not confronting said window, an optical filter arranged at the inlet of said first chamber to allow the flow of a radiations beam of a restricted frequency band only lying in the field of the IR-frequencies which can be absorbed by a searched for component, first and second thermistors housed in said first and second chambers, respectively, said first thermistor being positioned for receiving only a radiations beam of said restricted frequency band and said second thermistor being positioned for receiving at the same time a radiations beam unaffected by said filter, and means for electrically connecting said thermistors electrically in separate legs of a bridge circuit which can be balanced and is equipped with an unbalance-measuring instrument.

4,020,346

X-RAY INSPECTION DEVICE AND METHOD

Donald A. Dennis, 80 Seaview, Chatham, Mass. 02633

Continuation-in-part of Ser. No. 343,566, March 21, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 550,993
Int. Cl.² G01N *23/00*
U.S. Cl. 250—358 R **4 Claims**



1. Apparatus for the production and visual inspection of the moving fluoroscopic image of an article during movement of said article through said apparatus, comprising a shielded housing, an X-ray exposure station within said housing comprising an X-ray emission station, a fluoroscopic screen shielded against the transmission of X-rays and a baggage inspection station located between said emission station and said screen, said emission station comprising an X-ray emission tube adapted to emit a continuous beam of X-rays of low intensity through said inspection station and onto the surface of said screen, said X-rays being of such low intensity as not to damage photographic film, and a shielded focal member having an opening which focuses all of the X-rays emitted from said emission station as a divergent beams which strikes substantially only the surface of said screen, a television camera

adapted to produce video signals corresponding to fluoroscopic images produced on said screen, intensifier means associated with said camera for converting the weak low-intensity X-ray images present on the fluoroscopic screen to video signals which are intensified by a factor of at least about 1000 times gain, a television monitor which is viewable outside said housing by an operator and is associated with said camera and is adapted to receive said intensified video signals and produce intensified television images on said monitor corresponding to the fluoroscopic images present on the fluoroscopic screen, conveyor means for continuously moving an article to be inspected into said X-ray exposure station through an entrance opening in said shielded housing, into said baggage inspection station and out of said shielded housing through another opposed exit opening therein to provide a continuous moving fluoroscopic image of said article passing through said baggage inspection station, sensing means in the area of said entrance opening to sense the entry of an article to be inspected and to activate the X-ray emission tube until a predetermined period of time after the article passes said means, and shielded flexible curtains means covering each of said opposed openings and adapted to retard the escape of X-rays from said inspection station while permitting said article to be conveyed therethrough, said flexible curtain means comprising two spaced banks, each of which comprises two superposed layers of vertically-slit leaded-vinyl plastic, the slits in one of said layers being offset from the slits in the other of said layers.

4,020,347

MAMMOGRAPHY

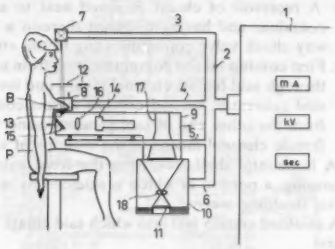
Ronald Jan Geluk, Nootdorp, Netherlands, assignor to N.V. Optische Industrie de Oude Delft, Delft, Netherlands

Filed Mar. 29, 1976, Ser. No. 671,378

Claims priority, application Netherlands, Apr. 1, 1975, 7503862

Int. Cl.² A61B *6/00*; G01T *1/20*

U.S. Cl. 250—361 R **11 Claims**



1. A method of detecting and recording breast cancer, wherein a breast is exposed to X-rays, the transmitted beam of rays is scanned by a moving strip-shaped screen and the image of the strip-shaped screen is picked up by a television pickup tube moving along with the screen and displayed on a monitor tube.

4,020,348

GANTRY SCANNING CAMERA

Ronald E. Turcotte, Ridgefield, Conn.; Jay R. Wolff, Highland Park, Ill.; Anthony P. Del Medico, Niles, Ill., and Paul C. Lee, Palatine, Ill., assignors to G. D. Searle & Co., Skokie, Ill.

Filed May 12, 1975, Ser. No. 576,357

Int. Cl.² G01T *1/166*

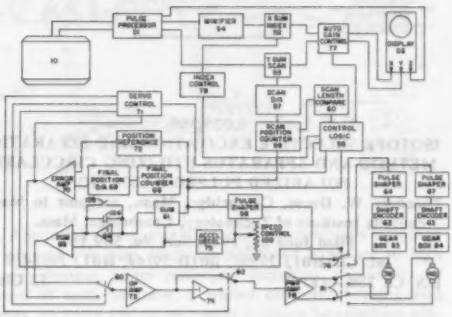
U.S. Cl. 250—363 S **18 Claims**

1. A gantry supported scanning scintillation camera system comprising:

a scintillation camera emloying a movable detector head and detached signal processing and image recording means;

an elevated gantry support from which said detector head is suspended, said gantry support comprised of a pair of parallel longitudinal rails, a carriage support assembly supported by and spanning the distance between said longitudinal rails and longitudinally positionable with respect thereto and comprising a pair of parallel rails transverse with respect to said longitudinal rails, a carriage assembly supported by said carriage support ssembly and carrying said detector head and positionable along the length of said carriage support assembly, and separate drive units each employing a rotating motor shaft and motion conversion means to convert the rotational motion of the motor shaft to translational movement, said drive units respectively driving said carriage support assembly along said longitudinal rails and driving said carriage along said transverse rails;

translation inducing means for laterally moving said detector head within a viewing area to define an expanded rectilinear field of view bounded by predetermined limits whereby said detector head views a segment of said viewing area which varies with the lateral position of said detector head;



detector position sensing means for generating electrical signals corresponding to the lateral position of said detector head within said viewing area said detector position sensing means comprised of separate shaft encoders each associated with a respective one of said motor shafts and each generating electrical pulses corresponding to revolutions of the associated motor shaft, pulse counting means associated with said shaft encoders for tabulating said electrical pulses in proportion to the number of revolutions of said motor shafts, whereby said pulse counting means is incremented in response to motor shaft rotation in one direction and decremented in response to shaft rotation in the opposite direction, digital to analog conversion means associated with said counting means to collectively and proportionally produce from the tabulated pulse counts therein the aforesaid electrical signals corresponding to the lateral position of the detector head; and

signal combining means receiving input signals from said signal processing unit and from said detector position sensing means to provide composite output signals to said image recording means representing the locations within said expanded field of view fom which radiation emanates.

4,020,349

APPARATUS FOR READING AND RECHARGING CONDENSER IONIZATION CHAMBERS

Richard C. McCall, 170 Hobart Heights, Woodside, Calif. 94062

Filed Oct. 28, 1975, Ser. No. 626,188

Int. Cl.² G01T *1/18*

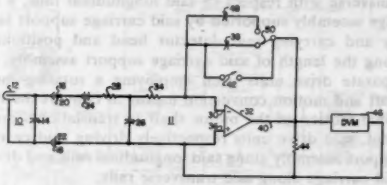
U.S. Cl. 250—377 **9 Claims**

1. An apparatus for recharging a condenser ionization chamber and simultaneously measuring the amount of charge required to recharge it, comprising:

input means for connection to a condenser ionization chamber;

a source of potential coupled to the input means;

an integrator circuit having an input connected to the source of potential and having an output; and



measuring means coupled to the output of the integrator circuit for measuring the amount of charge stored in the integrator circuit.

4,020,350

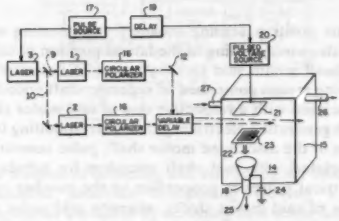
ISOTOPE SELECTIVE EXCITATION AND SEPARATION METHOD AND APPARATUS UTILIZING CIRCULARLY POLARIZED PULSED RADIATION

Theodore W. Ducas, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed June 23, 1975, Ser. No. 589,168

Int. Cl.[2] H01J *27/00;* **B01D** *59/44;* **H01J** *39/34*

U.S. Cl. 250—423 P **12 Claims**



1. A method for selectively populating high-lying excited states of atoms or molecules comprising

energizing said atoms or molecules with a first circularly polarized pulsed radiation, the coherent frequency components of said first pulsed radiation have frequencies corresponding to the energy difference between a lower energy level and the frequency split levels of an intermediate energy level, the duration of said pulse being less than $2\pi/\Delta\omega$, where $\Delta\omega$ is the frequency difference of the splt levels,

applying a second circularly polarized pulsed radiation energization to said atoms or molecules for a time subsequent to the termination of said first radiation, the coherent frequency components of said second pulsed radiation have frequencies corresponding to the energy difference between the split levels of said intermediate energy level and an upper energy level, the duration of said second pulse being less than $2\pi/\Delta\omega$,

the first and second radiation have the same handedness of circular polarization,

whereby said upper energy level has a greater population than prior to energization by said first and second radiation pulses.

4,020,351

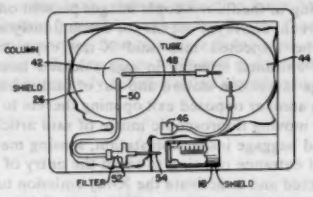
GENERATOR SYSTEM

Wayne Joseph Gemmill, Sr., Milford, Pa., and Frank Ernest Cerone, Jr., Marlboro, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed June 16, 1975, Ser. No. 587,263

Int. Cl.[2] G01T *1/00;* **G01N** *21/24*

U.S. Cl. 250—432 PD **13 Claims**



1. A self-contained, portable system for dispensing sterile, non-pyrogenic, isotonic solutions containing technetium-99m, which system is comprised of, in combination:

1. A housing fitted with carrying means, and having contained within said housing:

a. A radioisotope generator having disposed therein molybdenum-99, said generator being contained within a shielded container having a bottom portion in which is disposed said generator, and a top portion which is in engagement with said bottom portion, said bottom portion having female channel means on its top surface for ingress and egress of conduit means which carry eluant to said generator and eluate from said generator, said top portion having male protruding means on its bottom surface which engage said channel means to further shield said conduit means, the outermost ends of said top portion and said bottom portion being tapered to a lesser diameter than at said point wherein said top and bottom portions are in engagement,

b. A reservoir of eluant disposed next to said shielded container and having disposed thereon a sterile, one-way check valve communicating to the atmosphere,

c. First conduit means communicating from said reservoir through said female channel means and into one end of said generator, second conduit means communicating from the other end of said generator and through said female channel means to the exterior of said housing,

2. A horizontal shelf traversing the front exterior of said housing, a portion of which is shielded by movable exterior shielding means,

3. A shielded elution vial into which said eluate is dispensed, and

4. Filter means disposed at a point between said vial and said second conduit means.

4,020,352

SYSTEM FOR IRRADIATING FLOWABLE MATERIAL

Peter Mahler, Neu-Isenburg; Gerhard Frey, and Gotthard Lerch, both of Bruchkobel, all of Germany, assignors to Leybold-Heraeus GmbH & Co. KG, Cologne, Germany

Filed July 10, 1975, Ser. No. 594,677

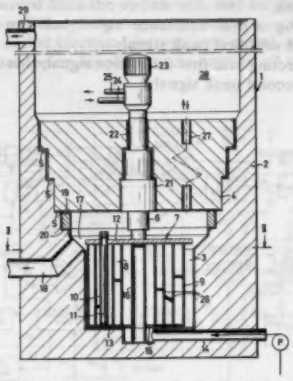
Claims priority, application Germany, July 18, 1974, 2434504

Int. Cl.[2] G21K *5/06*

U.S. Cl. 250—436 **12 Claims**

1. A system for irradiating flowable material, including means defining an irradiation chamber; inlet and outlet conduit means for introducing the flowable material into and discharging it from the irradiation chamber; wherein the improvement comprises wall means defining a spiral passage in said irradiation chamber for guiding the flowable material in a spiral path from said inlet conduit means to said outlet conduit means; a radiation source supported within said irradiation

chamber in the zone of said spiral passage for irradiating the material flowing therethrough; and a holding sleeve for accommodating said radiation source; said holding sleeve forming part of said wall means.



4,020,353
SAMPLE ANALYSIS APPARATUS USING ELECTRON BEAM IRRADIATION

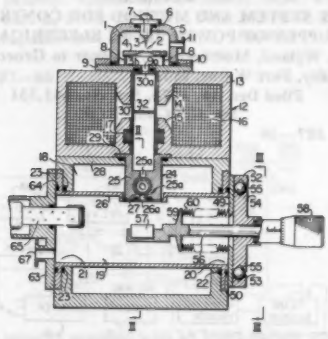
Syobu Saito, Mito, and Yoshio Sakitani, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 3, 1975, Ser. No. 609,943

Claims priority, application Japan, Sept. 6, 1974, 49-102029

Int. Cl.² H01J 37/06

U.S. Cl. 250—441 **16 Claims**



1. A sample analysis apparatus using electron beam irradiation, comprising: an electron gun chamber for housing an electron gun therein which is capable of emitting an electron beam along a beam path; a sample chamber for detachably housing therein a sample placed in position along said beam path, to be irradiated by the electron beam emitted by said electron gun; an intermediate chamber substantially located between said electron gun chamber and said sample chamber along said beam path and including means to permit said electron beam to pass therethrough and into said sample chamber to said sample to be irradiated; said intermediate chamber having a larger volume than said sample chamber; evacuation means for evacuating said electron gun chamber, said intermediate chamber and said sample chamber; means for controlling said evacuation means to evacuate said intermediate chamber to a degree of vacuum higher than said sample chamber and lower than said electron gun chamber; first valve means for connecting and disconnecting said electron gun chamber with and from said intermediate chamber in vacuum continuum; and second valve means for connecting and disconnecting said intermediate chamber with and from said sample chamber in vacuum continuum; at least that portion of said sample chamber in which said sample is located projecting into said intermediate chamber so that a portion of said sample chamber is closer to said electron gun chamber than a portion of said intermediate chamber.

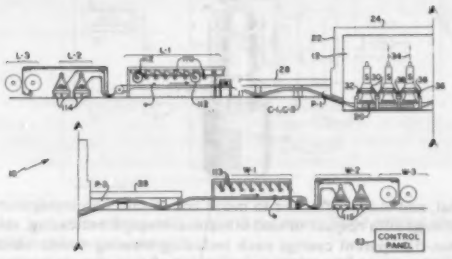
4,020,354
TREATMENT OF TIRE MAKING COMPONENTS

Glenn C. Fauss, Seville, Ohio, and Robert J. Scribner, Lynchburg, Va., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 580,003, May 22, 1975, abandoned. This application Sept. 13, 1976, Ser. No. 722,977

Int. Cl.² H01J 37/06

U.S. Cl. 250—492 B **3 Claims**



1. Apparatus for treating tire making components including tire ply and tire gum stock by controlled exposure to high voltage electron beam radiation, including a plurality of sources of said radiation, a walled chamber housing said sources, an entry and an exit each having a labyrinthine passage between said chamber and the surrounding space, conveyor means comprising a plurality of conveyors each having a conveying surface defined by closely spaced rigid bar slats extending normal to the travel direction and cooperable with another of said plurality of conveyors to provide a common conveying surface extending across both said conveyors, said conveyors being in close parallel side-by-side array for carrying said components through said chamber, let-off means for delivering a running length of a selected one of said components to said conveyor means, wind-up means for rewinding said running length as received from said conveyor means after treatment by said radiation, source mounting means respectively supporting each of said sources above and in operative relation to said conveyor means, said mounting means including a pair of spaced parallel rails bridging said conveyor means, a traversing plate supported on said rails for movement across said conveyor means, a support plate fixed rotatably on said traversing plate for rotation about a vertical axis and carrying the respectively associated source thereon, drive means respectively connected to traverse and to rotate the respectively associated said plates, control means situated outside the chamber, and means responsive to said control means to energize said drive means, whereby each said source can be positioned independently of the others thereof relative to said conveyor means.

4,020,355
RECEPTACLE FOR RADIOACTIVE MATERIAL

Thomas V. Czaplinski, North Brunswick, and Thomas Albert Haney, East Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 333,095, Feb. 16, 1973, abandoned. This application June 30, 1975, Ser. No. 591,990

Int. Cl.² G21F 5/00

U.S. Cl. 250—506 **11 Claims**

1. A receptable for storing a radioactive material container

comprising an outer casing of radiation shielding material, an intermediate casing of radiation shielding material, an inner casing of radiation shielding material, said radioactive material container situate in said inner casing, two of said casings being of non-transparent radiation shielding material and the third said casing being of transparent radiation shielding material, and means effective to move one of said non-transparent casings with respect to said other non-transparent casing, said non-transparent casings each including viewing means which can be aligned by relative movement of said non-transparent casings to establish a view path into the interior of said inner casing to perceive radioactive material in said container.

4,020,356

ABSORPTION BODY

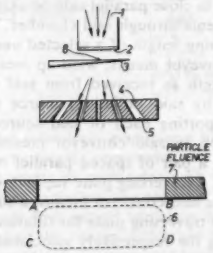
Anders Sven Brahme, Bromma, Sweden, assignor to Scanditronix, Instrument AB, Uppsala, Sweden

Filed Apr. 10, 1975, Ser. No. 567,141

Claims priority, application Sweden, Apr. 10, 1974, 7404930

Int. Cl.² G21K *3/00*

U.S. Cl. 250—510 **10 Claims**



1. Device to be used in the irradiation of a limited volume with high-energy particles, characterized by an absorption body having a pattern of holes for simultaneous and controlled influence of both the energy distribution of the radiation and the spatial distribution of the radiation in the depth direction and transversely throughout the radiated volume.

4,020,357

SIGNAL PROCESSING FOR PRINT SCANNERS

Giancarlo Punis, Sicklerville, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.

Filed Jan. 29, 1976, Ser. No. 653,450

Int. Cl.² G06K *7/10*

U.S. Cl. 250—568 **13 Claims**

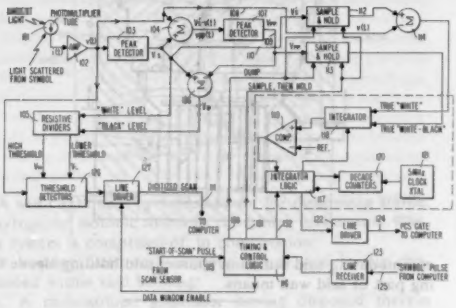
5. In a laser scanning system for monitoring and evaluating UPC symbols occurring periodically on a moving web, a method of detecting UPC data comprising:

a. developing a first signal proportional to light scattered from said web plus ambient light;

b. peak detecting said first signal, thereby developing a first peak signal;

c. developing a first difference signal between said first signal and said first peak signal;

d. peak detecting said first difference signal, thereby developing a second peak signal;



e. developing a second difference signal between said first peak signal and said peak signal;

f. processing said frist peak signal and said second difference signal to yield respective upper and lower threshold levels; and

g. comparing said first signal with said thresholds, producing a logical 1 when said first signal exceeds said upper threshold and producing a logical 0 when said first signal falls below said lower threshold.

4,020,358

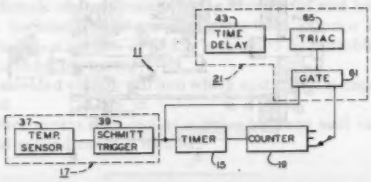
DEVICE SYSTEM AND METHOD FOR CONTROLLING THE SUPPLY OF POWER TO AN ELECTRICAL LOAD

Alvin D. Wyland, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Dec. 16, 1975, Ser. No. 641,331

Int. Cl.² G05D *23/00*

U.S. Cl. 307—39 **36 Claims**



34. A method of statistically staggering power consumption by a plurality of loads comprising the steps of:

a. counting modulo *n* for at least some of the loads at counting rates which differ from one another; and

b. disabling given ones of the loads when its corresponding count exceeds a preselected count individual to the given ones of the loads which number is less than *n*.

4,020,359

ELECTRICAL CONTROL SYSTEM

Walter Tate, High Wycombe, and Thomas Robertson, Darlington, both of England, assignors to Davy Powergas Limited and Rotraco Systems Limited, both of, England

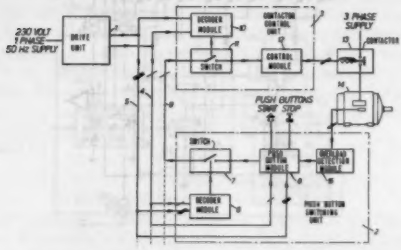
Filed Mar. 24, 1975, Ser. No. 561,432

Int. Cl.² G05B *11/42*

U.S. Cl. 307—40 **11 Claims**

1. An electrical control system for controlling a plurality of electrical loads each having a contactor in the electrical supply circuit thereto, said system comprising for each load a switch unit including means for producing electrical signals

representative of the condition of the switch unit, a contactor control unit connected so as to control the operation of the contactor in the supply circuit to the load in response to signals received from the switch unit, and an electrical signal generating unit for producing output signals including a fixed frequency coded electrical interrogator signal, said last mentioned signals being supplied to the units of all the loads, and



an electrical link conductor to which all of the units are connectable, the two units associated with each load being responsive to the same part of the period of the interrogator signal to connect the units to the electrical link conductor and during said part of the period the units of the other loads are non-responsive thereto and said units are not connected to the link conductor.

4,020,360

INVERTER CONTROL SYSTEM

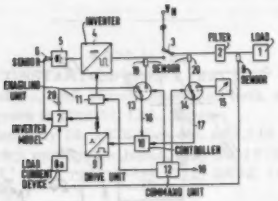
János Udvardi-Lakos, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 26, 1975, Ser. No. 617,176

Claims priority, application Germany, Sept. 27, 1974, 2446299; Oct. 8, 1974, 2447951; Feb. 24, 1975, 2507866; July 8, 1975, 2530465; July 17, 1975, 2532056

Int. Cl.² H02J *9/06*

U.S. Cl. 307—66 **23 Claims**



1. In an inverter supplied with an input voltage and having a power stage including controlled rectifiers controlled by a control unit containing a drive unit and a control device in the form of an integral controller, the drive unit providing output firing pulses for the controlled rectifiers whose firing angle is dependent on a control voltage developed by the integral controller, said inverter being a stand-by controller for taking over a load in the case of an emergency, means for permitting rapid start up of the power stage such that it immediately provides a full output voltage without delay comprising:

a. an enabling unit interposed between the drive unit and power stage which is capable of selectively enabling or blocking the transmission of firing pulses in response to a control input;

b. means for developing and supplying to the control unit a control voltage which is such as to result in a correct voltage at the output of the inverter with the load which it must take over for any starting instant; and

c. a command unit having an input for receiving a starting command and providing an output to the control input of said enabling unit to enable it to transmit firing pulses from said drive unit to the controlled rectifiers of said power stage.

4,020,361

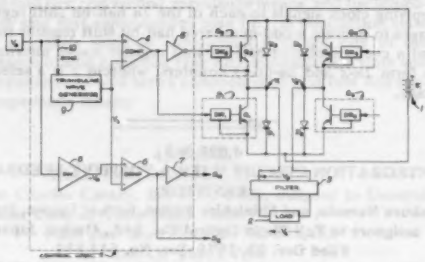
SWITCHING MODE POWER CONTROLLER OF LARGE DYNAMIC RANGE

Larry R. Suelzle, and Leonard O. Hodges, both of Huntington Beach, Calif., assignors to Delta Electronic Control Corporation, Costa Mesa, Calif.

Filed Oct. 4, 1974, Ser. No. 512,059

Int. Cl.² H03K *3/00*

U.S. Cl. 307—106 **11 Claims**



1. In a circut for producing a three state, PDM output, the combination comprising

a. switches S_1 and S_3 connected in series and across a voltage source, S_1 and S_3 being in opposite states of conduction,

b. switches S_2 and S_4 connected in series and across the voltage source S_2 and S_4 being in opposite states of conduction,

c. a load with one end connected with the common point between switches S_1 and S_3 and the other end connected with the common point between switch S_2 and S_4, and

d. means to produce a short pulse of interval Δt across the load by controlling the switches to switch from one of the two states which produce 0 voltage across the load (S_1 ON and S_2 ON, or S_3 ON and S_4 ON), to an intermediate state where voltage is produced across the load (S_1 ON and S_4 ON, or S_3 ON and S_2 ON), and then to other 0 voltage state, said means including a wave generator and comparator means responsive to the output of the wave generator and to an input signal waveform V_s to produce a first comparison output for controlling S_1 and S_3, and a second comparison output for controlling S_2 and S_4.

4,020,362

COUNTER USING AN INVERTER AND SHIFT REGISTERS

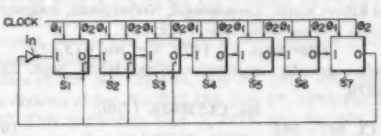
Yasoji Suzuki, Ayase; Kenshi Manabe, and Masataka Hirasawa, both of Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed July 2, 1975, Ser. No. 592,643

Claims priority, application Japan, July 5, 1974, 49-76940

Int. Cl.² H03K *21/36, 23/08*

U.S. Cl. 307—225 C **13 Claims**



1. A counter for counting clock signal comprising $2n+1$ cascade-connected stages each having an input and output,

one stage of which is an inverter and the remaining $2n$ stages of which are 1st to $2n$-th half-bit shift registers each operative to produce at the output an output state corresponding to an input data state at the input in response to clock signals to be counted, at least one of the even-numbered stages of the 2nd to $2(n-2)$-th half-bit shift register stages only or at least one of the odd-numbered stages of the 3rd to $(2n-3)$-th half-bit shift register stages only having an additional input and being operative to produce at the output an output state corresponding to an input data state on the input when the additional input is at a first voltage level and operative to make the output at a predetermined voltage level when the additional input is at a second voltage level; means for coupling the output of the final stage of said cascade connection and the additional input of at least one of the half-bit shift registers; and means for applying clock signals to each of the $2n$ half-bit shift register stages to operate n odd-numbered half-bit shift register stages and n even-numbered half-bit shift register stages alternately to form $2n$-x and $2n$-$(x$-1) counters, wherein x is a selected stage.

4,020,363

INTEGRATION CIRCUIT WITH A POSITIVE FEEDBACK RESISTOR

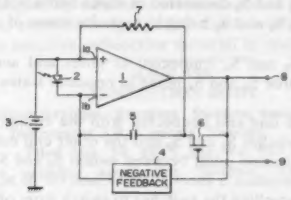
Saburo Numata, and Shinichiro Fujino, both of Urawa, Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Dec. 23, 1975, Ser. No. 643,814

Claims priority, application Japan, Dec. 25, 1974, 49-186

Int. Cl.² G06G *7/12*; H03K *5/00*; G06G *7/18*

U.S. Cl. 307—229 **5 Claims**



1. An integration circuit comprising an operational amplifier, a negative feedback circuit composed of an integrating capacitor and a switch means connected in series therewith, said negative circuit being connected between the output terminal and the negative input terminal of the operational amplifier, a negative feedback element connected in parallel with said negative feedback circuit, and a current limiting means connected between the positive input terminal and the negative input terminal, wherein the improvement comprising a positive feedback resistor connected between the positive input terminal and a connecting point between said integrating capacitor and said switch means, the resistance of said feedback resistor being higher than the resistance of said switch means when the switch means is in its ON-state and lower than the resistance of said switch means when the switch means is in its OFF-state, whereby the potential difference across said integrating capacitor is made substantially zero.

4,020,364

RESISTANCE READ AMPLIFIER

Karel Elbert Kuijk, Emmasingel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

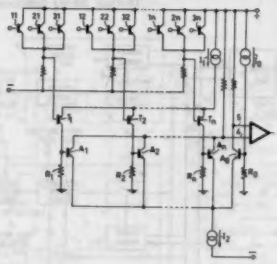
Filed Sept. 15, 1975, Ser. No. 613,621

Claims priority, application Netherlands, Sept. 28, 1974, 7412870

Int. Cl.² H03K *17/60*

U.S. Cl. 307—242 **10 Claims**

1. A circuit for determining at will the resistance of any one resistor of a group of resistors comprising, a current source having a high internal resistance, a plurality of electronic selection switches for selecting one resistor at a time from said group of resistors, output amplifier means coupled to said resistors, means connecting a first resistor in a first series circuit with a first selection switch, a second resistor in a second series circuit with a second selection switch, and so on, and with said series circuits connected in parallel, means



connecting said current source in common to all of said series circuits, and means or operating said selection switches so that the switches cause a current from the current source to flow through one selected resistor only and simultaneously applies to the output amplifier means the voltage developed across the selected resistor and no other resistor.

4,020,365

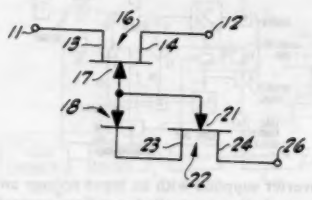
INTEGRATED FIELD-EFFECT TRANSISTOR SWITCH

Basil Weir, San Jose, Calif., assignor to Intersil Incorporated, Cupertino, Calif.

Filed Mar. 22, 1976, Ser. No. 669,395

Int. Cl.² H03K *17/04*, *17/60*; H01L *29/80*, *27/04*

U.S. Cl. 307—251 **5 Claims**



1. An improved monolithic electronic switch comprising

a junction field-effect transistor having source, drain and gate regions disposed in a single die of semiconducting material,

switch terminals electrically connected to the source and drain regions of said junction field-effect transistor,

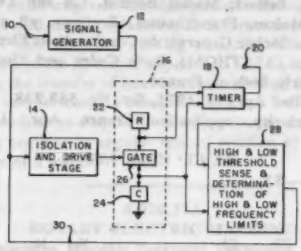
a semiconductor diode formed in said single die adjacent said junction field-effect transistor and having an anode region connected to the gate region of said junction field-effect transistor within said die, and

a small field-effect transistor having source, drain and gate regions disposed in said same single die with said source thereof comprising at least a portion of a cathode region of said diode, said gate being connected to the gate region of said junction field-effect transistor and said drain thereof having an external electrical connection for receiving signals to control conduction of said junction field-effect transistor.

4,020,366
PULSE TRAIN FREQUENCY CONTROL MEANS

Edward M. Garner, Kettering, and Raymond S. Duley, Centerville, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 22, 1976, Ser. No. 679,549
Int. Cl.² H03K *1/16*
U.S. Cl. 307—271 **14 Claims**



1. A circuit for providing a pulse train, comprising:

timing means to produce a pulse train of pulses at one of two predetermined upper and lower frequencies or varying therebetween in response to input signals applied thereto;

control means for providing signals representative of said frequencies to said timing means;

signal generating means coupled to said control means to provide an input signal to said control means representative of said upper and lower frequency levels and transitions therebetween in response to the application to said signal generating means of input signals thereto at one of two levels; and

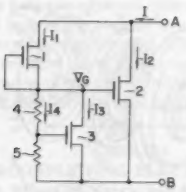
sensing means responsive to threshold levels sensed from said timing means and said control means and coupled to said signal generating means to control said input signal to said control means,

whereby said input signals to the timing means cause said timing means to produce a pulse train varying between the predetermined frequency limits.

4,020,367
CONSTANT-CURRENT CIRCUIT

Osamu Yamashiro, and Shunji Shimada, both of Kodaira, Japan, assignors to Hitachi, Ltd., Japan

Filed May 18, 1976, Ser. No. 687,510
Claims priority, application Japan, May 28, 1975, 50-62869
Int. Cl.² H02J *1/04*; G05F *1/52*; H03K *1/12*
U.S. Cl. 307—297 **5 Claims**

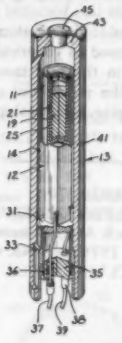


1. A constant-current circuit comprising a depletion type FET having its drain adapted for connection to a bias source, first and second impedance means connected in series with each other, one end of the series connection of said first and second impedance means being connected to the source of said depletion type FET while the other end of the series connection of said first and second impedance means being adapted for connection to a common potential source, a first enhancement type FET having its drain and source connected to the drain of said depletion type FET and said other end of the series connection of said first and second impedance means respectively, and a second enhancement type FET having its gate and source connected to the juncture between said first and second impedance means and said other end of the series connection of said first and second impedance means respectively, the gate of said first enhancement type FET and the drain of said second enhancement type FET being connected to the juncture between the source of said depletion type FET and said one end of the series connection of said first and second impedance means, the impedance of said second enhancement type FET in conduction state being negligibly small in comparison with that of said series connection of said first and second impedance means, and the impedance of said first enhancement type FET in conduction state being negligibly small in comparison with the sum of the impedance of said depletion type FET in conduction state and the impedance of said series connection of said first and second impedance means.

4,020,368
ELECTRIC POWER GENERATOR

Homer Charles Carney, Del Mar, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Jan. 23, 1975, Ser. No. 543,413
Int. Cl.² H01V *1/30*
U.S. Cl. 310—4 R **8 Claims**



1. An electric power generator comprising a heat source, a thermoelectric converter, an encapsulating enclosure enclosing said heat source and said thermoelectric converter, and a transparent thermal insulating medium between said heat source and said enclosure and between said thermoelectric converter and said enclosure; said heat source, said thermoelectric converter, and said enclosure having facing metallized surfaces which are sufficiently heat reflective to substantially inhibit radiation of heat from said heat source and said thermoelectric converter to said enclosure through said transparent medium, said metallized surface of said thermoelectric converter having a thickness of less than about 0.10 microns.

4,020,369
COMPACT MECHANICALLY-POWERED ELECTRIC GENERATOR FOR A CAMERA OR OTHER APPARATUS

William E. Shoupp, Pittsburgh, and Walter V. Bratkowski, McKeesport, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 488,606, July 12, 1974, abandoned, which is a division of Ser. No. 380,180, July 17, 1973, Pat. No. 3,842,427. This application Sept. 2, 1975, Ser. No. 609,278
Int. Cl.² H02K *35/00*
U.S. Cl. 310—15 **10 Claims**

1. A mechanically-powered generator for producing a pulse

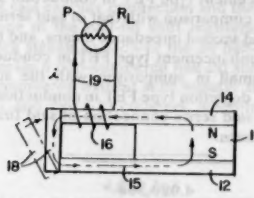
of electrical energy, said generator comprising the combination of;

a permanent magnet,

a pair of spaced pole pieces secured to said magnet and defining therewith a magnetic circuit,

a keeper of ferromagnetic material hingedly coupled to one of said pole pieces and swingable from a cocked position toward and away from the other pole piece,

a spring coupled to said keeper and one of said pole pieces and operative, when placed in tension and then released, to rapidly move the keeper into bridging relationship with said pole pieces, said spring being coupled to the keeper



in a manner such that the spring is in tension when the keeper is disposed at said cocked position in non-bridging relationship with said pole pieces,

latch means for releasably holding said keeper in spring-loaded condition and non-bridging position relative to said pole pieces, and,

a wire coil disposed in inductive relationship with said magnetic circuit and oriented to generate a voltage pulse in response to changes in the reluctance of the magnetic circuit produced by the movement of the keeper from non-bridging to bridging relationship with said pair of spaced pole pieces.

4,020,370

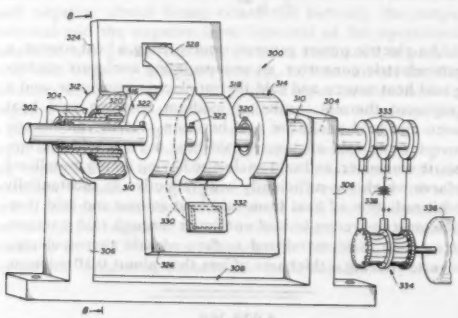
ELECTRIC MOTOR FOR GENERAL PURPOSES

Domenic Borello, 142 Nyack Ave., Pelham, N.Y. 10803

Filed Dec. 15, 1975, Ser. No. 640,974

Int. Cl.² H02K *7/06*

U.S. Cl. 310—37 **4 Claims**



1. In an electric motor of the type including plural stator coils each having a central opening and electrically connected to generate a magnetic field, and a magnetizable rotor adapted to be powered in rotation by said field, the improvements comprising a rotor formed of at least two plunger-like members journalled for rotation and disposed 180° apart, and at least two said stator coils, each of which is operatively arranged in cooperating relation with each said plunger member by being located in a slightly advanced position relative thereto, said coils being operatively arranged to be urged through rotation to thereby correspondingly urge said plunger members through rotation, whereby said generated magnetic field exerts a force on said rotor tending to pull it centrally through, rather than merely past, each said coil.

4,020,371

ELECTRIC ROTATING MACHINE HAVING A CRYO-INDUCTOR

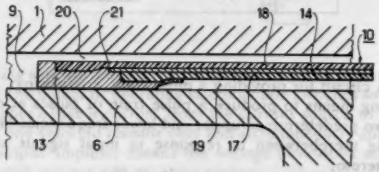
Roger Gillet, Belfort; Michel Berthet, Gif sur Yvette, and Francois Moisson-Franckhauser, Bretigny, all of France, assignors to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris Cedex and Electricite de France, Paris, both of, France

Filed Apr. 15, 1975, Ser. No. 568,238

Claims priority, application France, Apr. 17, 1974, 74.13314

Int. Cl.² H02K *9/00*

U.S. Cl. 310—52 **12 Claims**



1. In a rotating electrical machine having a rotatable shaft and a rotor fixed to the shaft, and wherein the rotor includes an inner cryogenic cylindrical inductor structure thermally insulated from an outer non-cryogenic cylindrical member by a cylindrical space for holding a vacuum, said cryogenic inductor structure being mechanically connected in a fluid-tight manner to said non-cryogenic cylindrical member by two cylindrical portions subjected to a temperature gradient, thereby forming the cylindrical space; and a coaxial intermediate cylindrical thermal reflector screen disposed in the space and fixed at its opposite axial ends to said cylindrical portions by thermally conductive elements; the improvement wherein said screen comprises at least one layer of separate thermally conductive strips arranged parallel to one another between said opposite axial ends of said screen.

4,020,372

COOLING OF DISCOIDAL DYNAMOELECTRIC MACHINES

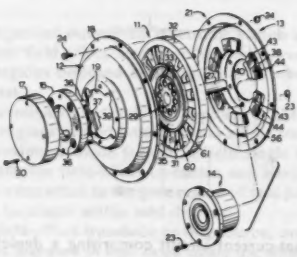
Eric Whiteley, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Sept. 15, 1975, Ser. No. 613,566

Claims priority, application Canada, Oct. 9, 1974, 211065

Int. Cl.² H02K *9/00*

U.S. Cl. 310—61 **6 Claims**



1. A disc-type, axial gap dynamoelectric machine having a magnetic stator structure; a discoidal rotor; an enclosure for the stator structure and rotor; means for supporting said rotor for rotation in axially spaced, flux linking relation with said stator structure; and a cooling fluid in the spaces between the

stator structure and rotor; the electromagnetic portion of said rotor being a rigid, self supporting, resin bonded winding structure consisting essentially of a plurality of coils overlapped in a circular array, interconnected electrically and bonded together with a resinous bonding medium to provide a unitary structure having an annular disc portion containing radially disposed coil sides and coaxial ring portions on the inner and outer edges of the disc portion containing the coil end heads and end conductors; and formations in selected regions of said resinous winding structure interrupting the surface area of the structure exposed to said fluid and thereby enhancing the transfer of heat from the winding conductors to the fluid; said formations comprises discrete bundles of resin bonded conductors disposed radially between said inner and outer ring portions in angular spaced relation so as to resemble spokes of a wheel.

4,020,373

ROTARY ELECTRIC MACHINE

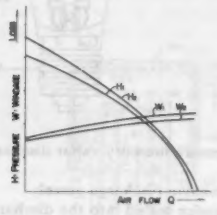
Hiroe Yamamoto, Ibaraki; Noriyoshi Takahashi, and Masatoshi Watanabe, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 1, 1975, Ser. No. 618,341

Claims priority, application Japan, Oct. 4, 1974, 49-113896

Int. Cl.² H02K *1/32*

U.S. Cl. 310—61 **3 Claims**



1. A rotary electric machine comprising a rotary shaft, a plurality of spider arms projecting radially from said rotary shaft, an electromagnetic rotor device arranged on the outer periphery of said spider arms, an electromagnetic stator device disposed opposite to said electromagnetic rotor device with a predetermined space therebetween, an end cover for covering axial sides of said electromagnetic stator device, said end cover having an inner end thereof arranged midway on the radius of said spider arms in slightly spaced relationship with the side wall of said arms so as to provide a small space therebetween and, a spider cover on the side of said spider arms axially thereof, said spider cover having at least one inner and outer air inlet hole, each air inlet hole being smaller than the space between adjacent ones of said spider arms, said inner air inlet hole being situated at a position on said spider cover a smaller distance from said rotary shaft then said outer air inlet hole, said end cover having an end thereof positioned between said outer air inlet hole and said inner air inlet hole in slightly spaced relation with said spider cover.

4,020,374

SUPERCONDUCTING ELECTRIC MOTORS

Alain Maillfert, Villers les Nancy, and Michel Kant, Paris, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Filed Mar. 21, 1975, Ser. No. 560,931

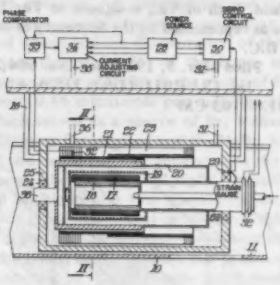
Claims priority, application France, Mar. 28, 1974, 74.10962

Int. Cl.² H02K *7/06*

U.S. Cl. 310—80 **12 Claims**

1. Linear electric motor, comprising: a passive, electrically conducting, tubular track,

an assembly movable along the track, said assembly comprising a D.C inductor coil of superconducting material, freely rotatable about an axis close to the track, and at least one normally conducting auxiliary polyphase winding coaxial with the inductor coil, wound so as to create a field rotating in synchronism with the field of the inductor coil, when polyphase A.C. currents delivered by a power source circulate therein,



and means for transmitting driving forces directed parallel to the track from the auxiliary winding to a vehicle to be moved along the track.

the track and the poles of the inductor coil being constituted such that the currents induced in the track by the rotation of the inductor coil exert forces on said auxiliary winding whose resultant has a component parallel to the direction of the track.

4,020,375

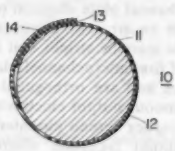
DYNAMOELECTRIC MACHINE COIL

Robert O. Weisz, Fort Wayne, Ind., assignor to Essex International, Inc., Fort Wayne, Ind.

Filed June 15, 1973, Ser. No. 370,201

Int. Cl.³ H02K *3/04*

U.S. Cl. 310—208 **4 Claims**



1. In a dynamoelectric machine coil including an insulated electrical conductor which has at least one sharp bend, the improvement which comprises the insulated electrical conductor being a metal conductor having a single ply wrapping of electrical insulation material which will withstand bending of the insulated conductor about a mandrel having a diameter of six times the greatest transverse dimension of the conductor without rupture of the wrapping, the wrapping being a non-woven, non-crepe tape longitudinally wrapped in tubular form around the conductor, said tape at least completely encircling said conductor and having a marginal portion overlapping an inner first-wrapped portion to form a longitudinally extending seam, said tape being stretchable to an extent of at least 12% in a longitudinal direction axially parallel with the conductor and to an extent of at least 8% in a transverse direction normal to the conductor without rupture, an adhesive applied only between said overlapping portions of the tape to securely bond said overlapping portions together, and the tape having its inside surface in contact with the conductor and being free

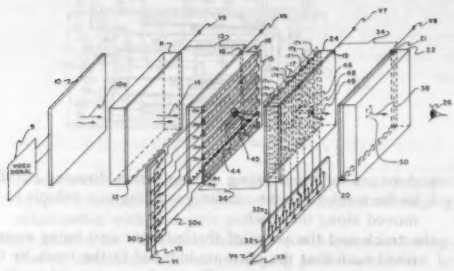
throughout its length for longitudinal movement on the conductor.

4,020,376

MINIATURE FLAT PANEL TWO MICROCHANNEL PLATE PICTURE ELEMENT ARRAY IMAGE INTENSIFIER TUBE

David A. Bosserman, Alexandria, and Charles F. Freeman, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 5, 1976, Ser. No. 664,219
Int. Cl.² H01J *43/00, 31/26, 43/04*
U.S. Cl. 313—103 CM **5 Claims**



1. A miniature flat panel picture element array image intensifier tube comprising:

a video picture signal generator for providing a video signal;

a radiation source, said radiation source being modulated by said video signal for creating a generally uniform flow of photons therefrom with said radiation source mounted on the front of a transparent input faceplate;

a photocathode layer on the inside of said input faceplate;

a first microchannel plate electron multiplier having a continuous input electrode in proximity focus with said photocathode layer and having as an output electrode an array of electrically isolated parallel output electrode metallic stripes;

a second microchannel plate electron multiplier have as an input electrode an array of electrically isolated parallel input electrode metallic stripes that are positioned close to the array of first microchannel plate output electrode metallic stripes and are orthogonal to each other and having a continuous output electrode;

a metallized phosphor screen mounted on the inside of a transparent output faceplate wherein said metallized phosphor screen is adjacent said second microchannel plate continuous output electrode and in proximity focus therewith;

a first bias voltage means connected across said photocathode layer and said first microchannel plate continuous input electrode for accelerating photoelectrons emitted from said photocathode layer to said first microchannel-plate;

a second bias voltage means connected across said second microchannel plate continuous output electrode and said metallized phosphor screen for providing proximity focus between said second microchannel plate and said metallized phosphor screen; and

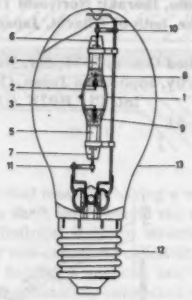
an array switching electronic means for switching bias voltages in some selected scan mode over said first microchannel plate array of output electrode metallic stripes and said second microchannel plate array of input electrode metallic stripes for selectively providing accelerating voltages between crossover stripes that have forward bias voltages applied thereto wherein repressive bias voltages exist on all other cross-over stripes that have reverse bias voltages applied thereto whereby electrons multiplied in said first microchannel plate enter the channels of said second microchannel plate in a charge pattern determined by said scan mode whereby the electrons that exit said channels of said second microchannel plate are converted into visible energy on said metallized phosphor screen for producing a visible image of said video signal according to said scan mode.

4,020,377

HIGH PRESSURE MERCURY VAPOR DISCHARGE LAMP

Hanns-Peter Popp, Hattingen, and Walter Pilz, Wolfratshausen, both of Germany, assignors to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH, Munich, Germany

Filed Apr. 8, 1976, Ser. No. 674,856
Claims priority, application Germany, Apr. 30, 1975, 2519377
Int. Cl.² H01J *61/068, 61/18, 61/33, 61/40*
U.S. Cl. 313—112 **14 Claims**



1. A high pressure mercury vapor discharge lamp comprising

a light-transmissive discharge vessel;

spaced electrodes sealed into the discharge vessel;

a filling in said discharge vessel comprising

mercury as the buffer gas,

an inert ignition gas,

at least one halide of at least one of the rare-earth metals selected from the group consisting of dysprosium, holmium, thulium, erbium, and terbium to effect excitation of molecular emission in the orange-red spectral region, and

thallium halide together with at least one halide of at least one metal selected from the group consisting of alkali and alkaline-earth metals to increase the vapor pressure of said rare-earth metal halides; and

a filtering agent acting as a filter in the blue spectral region, whereby when said lamp is discharged by passing a current through said electrodes, the lamp has a color temperature less than 4,500 K, a luminous efficacy of more than 70 lm/W, and a color rendering R_a greater than 70.

4,020,378

INTEGRAL MERCURY-VAPOR PRESSURE REGULATING MEANS FOR FLUORESCENT LAMP

Chalmers Morehead, Upper Montclair, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 293,239, Sept. 28, 1972, abandoned. This application Jan. 26, 1976, Ser. No. 652,360
Int. Cl.² H01J *61/20, 61/28, 61/35, 61/72*
U.S. Cl. 313—174 **22 Claims**

19. In a low-pressure gaseous discharge lamp having a sealed light-transmitting envelope that contains mercury, the combination comprising;

a member that constitutes an interior structural part of the lamp and has a surface portion that is indented and defines a recess which is accessible to mercury vapor produced within the envelope when the lamp is energized,

an electrode supported within said envelope at a location remote from said member,

a metal disposed within the recess in said member, said

metal being of a type that combines with mercury and forms an amalgam, and

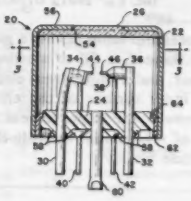
means retaining said metal in the recess defined by said member.

4,020,379

BULB-SHAPED FLASHTUBE WITH METAL ENVELOPE

William L. Manning, Walpole, Mass., assignor to EG&G, Inc., Wellesley, Mass.

Filed Oct. 2, 1975, Ser. No. 618,852
Int. Cl.² E05C 7/06
U.S. Cl. 313—220 20 Claims



9. A gaseous-discharge device, comprising:

an insulating base;

a plurality of conductors extending through said base;

a plurality of electrodes mounted on said conductors in a spaced configuration;

only one envelope sealed to said base to contain said electrodes, said envelope being made of metal and including a window opening; and

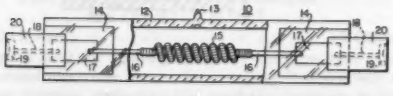
a transparent window sealed to the inside of said envelope at and over said opening for transmitting light therethrough upon an electrical discharge between the electrodes.

4,020,380

REGENERATIVE-CYCLE INCANDESCENT LAMP CONTAINING $HgBr_2$ ADDITIVE

Avinash D. Kulkarni, Montclair, and Ralph E. Newton, Dover, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 565,502, April 7, 1975, abandoned. This application Feb. 4, 1976, Ser. No. 655,306
Int. Cl.² H01K 1/50
U.S. Cl. 313—222 10 Claims



1. A regenerative-cycle incandescent lamp which is adapted to be operated at a selected voltage and has predetermined design life and efficiency ratings when operated at said voltage, said lamp comprising;

a sealed envelope of radiation-transmitting material that contains a filament which is composed essentially of tungsten,

conductor means extending through said envelope and connected to said filament,

an inert fill gas within said envelope, and

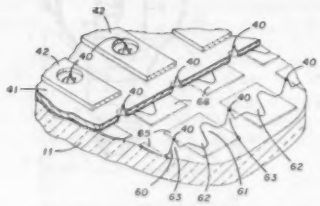
means in said envelope for establishing and sustaining a bromine-tungsten cycle within the lamp during the operation thereof which inhibits discoloration of the envelope and enhances the useful life of the lamp, said means comprises a quantity of $HgBr_2$ in the range of from about 0.13 to about 0.46 micromole per milliliter of envelope volume which serves as a source of Br_2 within the lamp when the filament is energized and the $HgBr_2$ is subjected to the heat and radiant energy generated by the incandescent filament, the amount of $HgBr_2$ initially present within said envelope and the quantity of Br_2 provided thereby during lamp operation being correlated with the design life and efficiency ratings of said lamp in a manner such that the initial $HgBr_2$ content and resultant Br_2 content both increase as the efficiency rating increases and the design life rating decreases.

4,020,381

CATHODE STRUCTURE FOR A MULTIBEAM CATHODE RAY TUBE

Frederick G. Oess, and Michael Peshock, Jr., both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 530,624, Dec. 9, 1974, Pat. No. 3,935,500. This application Jan. 15, 1976, Ser. No. 649,288
Int. Cl.² H01J 1/46, 21/10
U.S. Cl. 313—302 7 Claims



1. A cathode structure for a multibeam cathode ray tube comprising:

a. an elongated conductor having a peaked riser flanked on each side by deviated portions lying in a common plane perpendicular to the plane of said riser,

b. structure at the peak of said riser for enhancing electron emission therefrom upon current flow through said conductor, and

c. planar monolithic conductive structure contacting said deviated portions on said elongated conductor that forms paths for current flow to and from said risers.

4,020,382

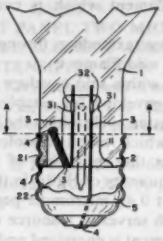
LAMP HAVING SCREW BASE

Barry Bolt, Howell, and Petrus Peters, Cranbury, both of N.J., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,388
Int. Cl.² H01J 5/48, 5/50
U.S. Cl. 313—318 2 Claims

1. A lamp including a glass bulb having a stem press with sealed-in lead wires, a glass screw base portion and a metal screw shell screwed on the base portion, comprising in said

base portion, a first channel extending across the glass threads, said first channel being relatively deep and broad to receive a sufficient amount of solder filling for mechanical



locking of the screw shell, a second channel extending across the glass threads and accomodating one lead wire so that the wire tightly fits into it, and an electrical contact provided by soldering the end of said one lead wire to the rim of said shell.

4,020,383

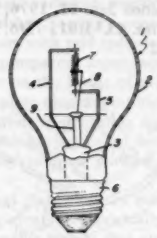
METHOD OF PULSING INCANDESCENT LAMP FILAMENTS

William M. Labadini, Salisbury; Edmund M. Passmore, Wilmington, and Warren A. Anderson, Danvers, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 31, 1975, Ser. No. 645,485

Int. Cl.² H01J *1/16, 19/06*

U.S. Cl. 313—344 **4 Claims**



1. In an incandescent lamp of the type having a coiled tungsten wire recrystallized filament mounted on lead-in support wires within a glass envelope and having high electrical contact resistance between the filament and the lead-in support wire, the process of reducing electrical contact resistance between the filament and the lead-in support wires by applying a pulse of electrical energy to the recrystallized filament.

4,020,384

LINEAR PARTICLE ACCELERATOR

John A. Richards, S. Hamilton, Mass., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 25, 1975, Ser. No. 607,318

Int. Cl.² H05H *9/00;* **H01J** *23/00, 29/00*

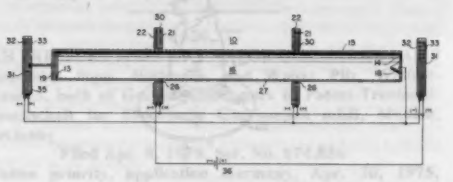
U.S. Cl. 313—359 **2 Claims**

1. A linear particle accelerator which impells a stream of charged particles against a target comprising

a sealed evacuated tube of dielectric material,

a particle source mounted in a first end of the tube and a target mounted in the second end of the tube, and

a drive unit mounted externally about said tube located between the tube ends, said drive unit consisting of a pair of pierced metal disks, each mounted back-to-back in a plane generally perpendicular to the axis of the tube, with both disks insulated from each other in a common insulated housing, in which the particle source and the target are connected to opposed polarities of an electrical voltage source, with the two disks of the drive unit each connected to opposed polarities of an electrical voltage source, with



the disk of the drive unit that is located nearer the particle source connected to a voltage source of opposed polarity to that of the particle source, and with the other disk of the drive unit connected to a voltage source of similar polarity to that of the particle source.

4,020,385

FLUORESCENT LAMP HAVING CONDUCTIVE FILM AND PROTECTIVE FILM THEREFOR

Costas C. Lagos, Danvers, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Aug. 9, 1976, Ser. No. 713,088

Int. Cl.² H01J *61/35, 61/44*

U.S. Cl. 313—489 **2 Claims**

1. In a fluorescent lamp having a glass envelope, electrodes at each end thereof, a fill of starting gas and low pressure mercury vapor, and a transparent electroconductive tin oxide film on the inner surface of the envelope with a phosphor coating thereover, the improvement which comprises a protective film of magnesium fluoride-titanium dioxide directly on the tin oxide film.

4,020,386

FLAT TYPE DISPLAY TUBE

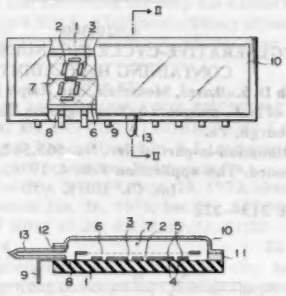
Osamu Yasutome, Taishi; Mitsuo Takeda, Tokyo; Tagayasu Sawamura, Himeji, and Norio Shinoda, Taishi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 24, 1975, Ser. No. 644,036

Claims priority, application Japan, Dec. 25, 1974, 49-156715[U]

Int. Cl.² H01J *1/62*

U.S. Cl. 313—496 **10 Claims**



1. A flat-type display tube comprising an insulating sub-

strate, a fluorescent display section consisting of a plurality of anode segments arranged in a predetermined pattern on the insulating substrate, a cathode disposed in a spaced apart relation to the display section, a box-like cover means hermetically sealed to the substrate in a manner to enclose the display section and the cathode, an exhaust tube mounted at the side wall of the cover means to communicate at one end with the interior of the cover means and extending outward in a manner to have the other end sealed, and a plurality of connecting means extending outward in the same direction of the exhaust tube and at least one or two of which are bent downward partway in a position short of the sealed free end of the exhaust tube, said connecting means having one end electrically connected to an external drive circuit and the other end electrically connected within the cover means to the display unit and cathode.

4,020,387

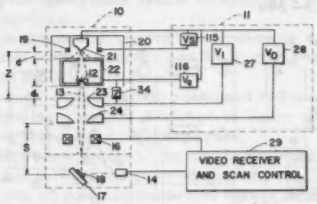
FIELD EMISSION ELECTRON GUN

Vincent J. Coates, Los Altos, and Leonard M. Welter, Saratoga, both of Calif., assignors to American Optical Corporation, Southbridge, Mass.

Continuation of Ser. No. 225,970, Feb. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 46,425, June 15, 1970, Pat. No. 3,678,333. This application Jan. 2, 1975, Ser. No. 537,996

Int. Cl.² H01J *29/56, 37/285*

U.S. Cl. 315—31 R **12 Claims**



1. A self-focusing field emission gun for use with a scanning charged particle microprobe systen comprising:

a housing defining a vacuum chamber;

a field emission tip disposed in said chamber for generating charged particles;

electrode means for establishing focusing and accelerating fields, for forming an accelerated and focused beam of said charged particle;

a separate field electrode disposed intermediate said tip and said focusing and accelerating electrode means, and in juxtaposition to said field emission tip for developing an electric field for generating said charged particles, said field electrode being positioned at a distance from said field emission tip selected to effect a predetermined focal distance and beam intensity;

voltage means connected to said electrode means, field electrode and field emission tip for supplying electrical potential to establish said focusing and accelerating and said particle generation fields.

4,020,388

DISCHARGE DEVICE

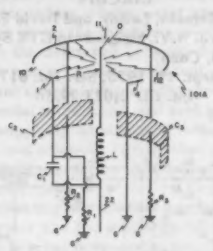
George W. Pratt, Jr., Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Sept. 23, 1974, Ser. No. 508,381

Int. Cl.² H01T *13/20*

U.S. Cl. 315—58 **18 Claims**

2. A spark plug for igniting a fuel-air mixture, that comprises, corona electrode means for charging fuel droplets in the fuel-air mixture, collecting and sparking electrode means for concentrating the fuel droplets in a collecting mode and for igniting the fuel droplets in a fuel ignition mode, the geometry of the collecting and sparking electrode means being such



that an enriched region of fuel-air mixture is provided that is extended in space and provides a large ignition zone.

4,020,389

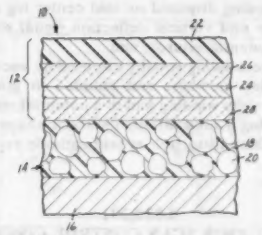
ELECTRODE CONSTRUCTION FOR FLEXIBLE ELECTROLUMINESCENT LAMP

Arthur D. Dickson, St. Paul, and Laurie E. Pruitt, West St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 5, 1976, Ser. No. 673,680

Int. Cl.² H05B *33/02*; **H01J** *9/02*

U.S. Cl. 315—246 **7 Claims**

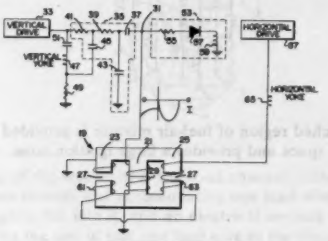


1. A flexible electroluminescent lamp comprising a light transmitting flexible resin body member having opposing faces and a finely divided electroluminescent phosphor embedded therein and electrically conducting electrode layers, one of which is at least substantially transparent, affixed to the opposing faces of the body member, the improvement wherein said substantially transparent electrode layer comprises a transparent polymeric substrate having on a surface thereof a three layer sandwich of a layer of a thin-film of a metal selected from the group including gold, silver, and copper between layers of thin-film dielectric materials generally exhibiting an index of refraction in excess of two, the outer dielectric layer being positioned adjacent the body member, wherein the metal layer has resistivity of less than 30 ohms/square and a thickness in the range between 70 and 180 A, and each of the layers of the thin-film dielectric material have a thickness in the range between 400 and 600 A., wherein the transmissivity of said transparent electrode layer to radiation to be emitted by the phosphor is not less than 70% and wherein the reflectance of said transparent electrode layer to visible radiation is less than 15%, whereby the transparent electrode layer enables the light source to operate at frequencies in excess of 400 Hz while maintaining substantially uniform brightness over the entire transparent electrode layer.

4,020,390
SIDE PIN-CUSHION DISTORTION CORRECTION CIRCUIT

Rudolph Francis Keinath, LeRoy, and David Eugene Manners, Alexander, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Sept. 29, 1975, Ser. No. 617,984
Int. Cl.² H01J 29/56
U.S. Cl. 315—371 **7 Claims**



1. In a television receiver having a cathode ray tube with a deflection angle of at least 90°, a DC potential source, horizontal and vertical deflection signal sources, and horizontal and vertical deflection yoke windings associated with the cathode ray tube and coupled to the horizontal and vertical deflection signal sources, a side pin-cushion distortion correction circuit comprising:

a saturable reactor having a two-window core with a solid center leg member and a pair of outer leg members, each of said outer leg members having an air-gap therein to provide a reluctance to flux flow in said outer leg members twice as great as the reluctance to flux flow in said solid center leg member and one of said outer leg members;

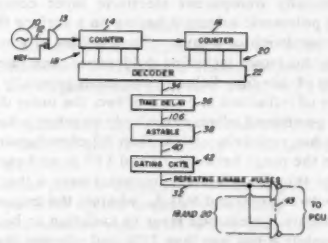
a control winding disposed on said center leg member and coupled to said vertical deflection signal source and to said DC potential source; and

an impedance winding equally disposed on each of said pair of outer leg members and coupled to said horizontal deflection yoke winding and to a potential reference level for providing a substantially parabolic-shaped correction of pin-cushion distortion at said cathode ray tube.

4,020,391
CRT CURSOR SCAN CONTROL CIRCUITS

William D. Baxter, Seymour, Conn., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Sept. 12, 1975, Ser. No. 612,892
Int. Cl.² G01R 13/30
U.S. Cl. 315—377 **10 Claims**



1. A scan control circuit for a CRT cursor comprising:

at least one cursor scan control key positioned in a keyboard;

means connected to the key for producing a unique coded signal in response to depression of the respective key;

first decoding means connected to the output of the signal producing means for decoding the coded signal;

means connected to the output of the first decoding means for detecting the occurrence of the coded signal for a preselected time interval indicative of prolonged cursor scan control key depression;

means connected to the output of the detecting means for generating repeating enable pulse signals during prolonged cursor scan control key depression;

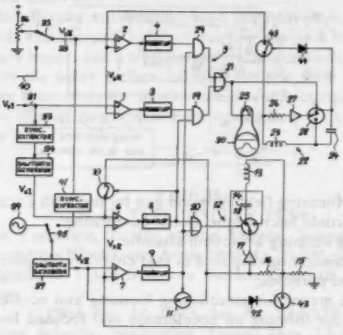
first gating means having first inputs thereof connected to the output of the generating means, second inputs thereof connected to the output of the coded signal producing means, the first gating means producing repeating coded signals at the output thereof, in response to coincidence of signals at the first and second inputs; and

means for connecting the output of the first gating means to a programmable control unit.

4,020,392
METHOD OF AND SYSTEM FOR VISUALLY DISPLAYING SEVERAL PERIODICALLY REPRODUCIBLE INPUT SIGNALS

Peter Harzer, Eningen u.A., and Hans Funk, Reutlingen, both of Germany, assignors to Wandel u. Goltermann, Reutlingen, Germany

Filed June 24, 1976, Ser. No. 699,258
Claims priority, application Germany, June 25, 1975, 2528235
Int. Cl.² H01J 29/52
U.S. Cl. 315—386 **10 Claims**



1. A method of simultaneously displaying a plurality of periodically reproducible input signals on an oscilloscope screen with the aid of a single electron beam, at least one of said input signals recurring at a predetermined repetition frequency, comprising the steps of:

generating a first and a second periodic raster signal for respectively deflecting said beam in an *x* direction and in a *y* direction orthogonal to said *x* direction, at frequencies substantially higher than the highest repetition frequency of the input signals to be displayed;

generating a plurality of ramp signals, one for each of said input signals, with periodicities corresponding to periods of reproducibility of the associated input signals;

continuously comparing said first raster signal with all said ramp signals;

upon detecting a coincidence between said first raster signal and any one of said ramp signals, temporarily reducing the rate of change of the beam deflection in said *x* direction to a value not greater than the slope of said one of said ramp signals and maintaining said value for an interval equaling at least one cycle of said second raster signal;

comparing, during said interval, said second raster signal with the input signal associated with said one of said ramp signals and, on detecting a coincidence therebetween,

substantially halting the deflection of the beam in said y direction for the remainder of said interval; and

maintaining said beam suppressed except during said remainder of said interval.

4,020,393

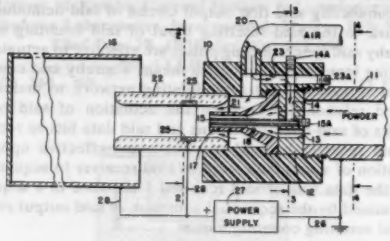
ELECTROGASDYNAMIC COATING DEVICE HAVING COMPOSITE NON-CONDUCTIVE FLOW CHANNEL, AND HOLLOW IONIZATION ELECTRODE FOR AN AIR JET

Donald H. Porter, Carlstadt, N.J., assignor to Estey Dynamics Corporation, Red Bank, N.J.

Filed July 16, 1975, Ser. No. 596,465

Int. Cl.[2] B05B 5/00

U.S. Cl. 361—227 **18 Claims**



1. An electrogasdynamic system for applying a coating to an article comprising:

a. a non-conductive conduit for conveying a stream of particles from a reservoir and for directing the particles toward the article to be coated;

b. a conductive needle axially positioned within said conduit for forming a corona discharge to ionize the particles passing through the adjoining space;

c. an electrode adjacent to the needle for forming an electric field between the electrode and the needle;

d. a source of potential connected between the electrode and the needle for creating a corona discharge;

e. an axial flow channel for forming a non-conductive boundary for the ionized particles as they move toward an article to be coated; and

f. an insert of tetrafluoroethylene which is positioned within said flow channel adjacent to said electrode for assuming an electric charge and thereby repulsing the ionized particles.

4,020,394

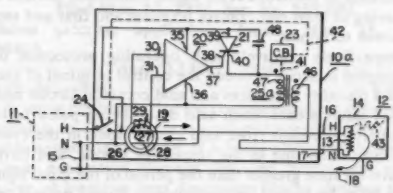
GROUND FAULT DETECTOR

Jerome Potash, Flemington, N.J., assignor to OPT Industries, Inc., Phillipsburg, N.J.

Filed May 20, 1976, Ser. No. 688,123

Int. Cl.[2] H02H 3/28

U.S. Cl. 361—45 **10 Claims**



1. A ground fault detector for connection between an electrical power source and a load, said source and said load each having a ground connection, a neutral terminal, and at least one other terminal, said detector comprising:

circuit interrupting means comprising a solenoid device having a primary actuating winding and at least one secondary winding;

a differential transformer having at least two primary windings and a secondary winding, said transformer developing a voltage across the secondary winding thereof corresponding to the difference between the currents flowing through the primary windings thereof;

amplifier means coupled between the secondary winding of said differential transformer and said circuit interrupting means for supplying an actuating voltage to the primary winding of said solenoid device when the voltage across said differential transformer secondary winding exceeds a predetermined value;

means for connecting one primary winding of said differential transformer and the secondary winding of said solenoid device in series between the neutral terminal of said power source and the neutral terminal of said load;

means for connecting another primary winding of said differential transformer between the other terminal of said power source and the other terminal of said load; and

means for supplying an exciting voltage to the primary actuating winding of said solenoid device, said exciting voltage being substantially less than the voltage across said primary actuating winding required to actuate said circuit interrupting means.

4,020,395

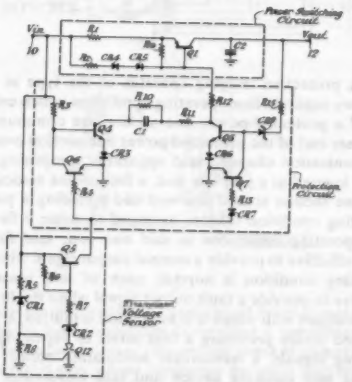
TRANSIENT VOLTAGE PROTECTION CIRCUIT FOR A DC POWER SUPPLY

John M. Erickson, Ocean, and Theodore Redgate, Brielle, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 17, 1975, Ser. No. 614,272

Int. Cl.[2] H02H 3/22

U.S. Cl. 361—59 **7 Claims**



1. A protective circuit for use with a DC power supply and a load which provides for rapid disconnection of the power supply and the load whenever transient overvoltages are impressed in the power supply circuit comprising:

input means connectable to the DC power supply output;

output supply voltage means connectable to a load;

gating means connected between said input means and said output means, said gating means having conductive and non-conductive states;

control means connected between said input and output means and to said gating means for switching said gating means from the conductive to the non-conductive state; and

transient voltage sensing means connected to said input means and to said control means, said transient voltage sensing means including switching means connected between said input and control means for causing said con-

trol means to switch said gating means to said non-conductive state whenever a transient voltage over a predetermined threshold is sensed whereby the non-conductive state of said gating means disconnects the power supply from the load, and for causing said control means to switch said gating means to said conductive state upon sensing a transient voltage less than said threshold to reconnect the power supply to the load, and further including first means for sensing said transient voltage over said threshold and second means for sensing said transient voltage less than said threshold.

4,020,396

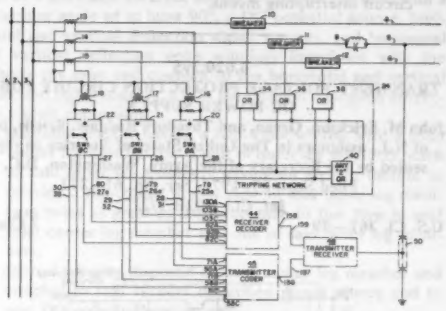
TIME DIVISION MULTIPLEX SYSTEM FOR A SEGREGATED PHASE COMPARISON RELAY SYSTEM

John C. Gambale, Livingston, and Roger E. Ray, Parsippany, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 548,132, Feb. 7, 1975, abandoned. This application Mar. 10, 1976, Ser. No. 665,650

Int. Cl.² H02H *7/26*

U.S. Cl. 361—64 **32 Claims**



1. A protective relaying aparatus of the type in which at least two separate line operating conditions which exist at one end of a protected power line section are communicated to the other end of the protected power line section over a single communication channel, said apparatus comprising, a transmitter located at a said one end, a first means associated with said line section at said one end and including a pair of line operating condition sensors arranged to sense a first pair of line operating conditions at said one end, said first means being effective to provide a normal output signal when the line operating condition is normal, each of said sensors being effective to provide a fault output signal when the line operating condition with which it is associated is faulted, a first clock actuated divice providing a first series of repeating periodic clocking signals, a transmitter modulating means interconnecting said clocking device and said transmitter and said sensing means, said modulating means being effective when receiving said normal signals from said first means to time-code said signals into a repeating time-coded normal word, said normal word comprising a plurality of serially arranged data bits, said modulating means being effective when a said fault signal is being received to terminate the time-coding of said normal word and to time-code fault words, each said fault word comprising a plurality of serially arranged data bits, the character of said data bits of said fault word being determined by scanning said output signals of said sensing means in a predetermined sequence, a receiver located at said other end and adapted to receive said words from said transmitter as a series of data bits, a second clocking device associated with said receiver and providing a second series of periodic clocking signals which have substantially the same time periods as the time periods of said first series, a first demodulating network connected to said receiver and to said second clocking device, said demodulating network having first and second output circuits, said demodulating network having a storage device having a predetermined number of output circuits, said storage device being effective when said receiver is sequentially receiving said data bits of said normal word to store said predetermined number of said received data bits in parallel form at its said output circuits, said predetermined number being at least the number of bits in said normal word, said demodulating network being effective each time said normal word is stored in said storage device to provide a synchronizing signal at its said first output circuit, a resetting counting means connected to said second clocking device and having a plurality of sequentially actuated output circuits, said counting means having a resetting input which when actuated resets said counting means to an initial condition in which a predetermined one of its said output circuits is actuated, means interconnecting said first output circuit of said demodulating network to the said resetting input of said counting means whereby said synchronizing pulses are effective to actuate said resetting input of said counting means whereby said counting means is reset by said demodulating network to maintain a desired relationship between the actuation of said output circuits of said counting means and said data bits as received by said receiver by said receiver being effective upon the reception of a said fault word by said receiver to sequentially scan the data bits of said received fault word in a sequence determined by the sequential actuation of said output circuits of said resetting counting means.

4,020,397

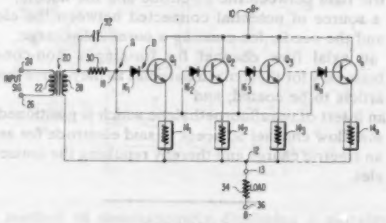
PARALLEL TRANSISTOR PROTECTION CIRCUIT

Robert H. Fasulkey, Fairfax, Va., and Vaughn L. Quidort, Lochearn, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 25, 1974, Ser. No. 509,175

Int. Cl.² H02H *7/20*

U.S. Cl. 361—24 **7 Claims**



1. A circuit arrangement for protecting the remainder of a plurality of semiconductor devices operated as a composite group in the event of any one of said devices fails in a shorted condition, comprising in combination;

input means having a common circuit node, adapted to receive an input signal;

a plurality of semiconductor signal translation devices each having at least one control terminal and first and second power terminals;

a respectively relatively slow operating protection diode coupled in series between the control terminal of each of said plurality of devices and said common circuit node of said input means, each said diode being poled to block supply potentials from said circuit node in the event of failure occurring in the respective device, and having a turn-off time greater than the period of the input signal in order to be turned on continuously during normal operation upon application of said input signal; however, said turn-off time being substantially faster than an electrical fuse device and thus preventing any prolonged application of said supply potential to the control terminals of the remainder of said devices;

means commonly coupling said first power terminal of said plurality of devices to a power source;

a load circuit; and

means coupled in series between each second terminal of said plurality of devices and said load circuit, said circuit means having a predetermined resistive impedance value for effecting current balance between said plurality of devices during normal operation and becoming operable after a predetermined time greater than the turn-off time of said diode to electrically remove the respective device from said circuit arrangement upon failure of said device.

4,020,398

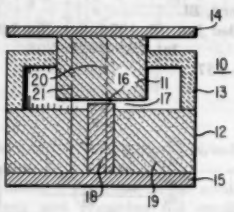
VOLTAGE SURGE PROTECTOR

Lee Graves McKnight, Convent Station, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 645,088

Int. Cl.² H02H 9/06

U.S. Cl. 361—60 **11 Claims**



1. An overvoltage surge protector comprising a first electrode, a second electrode and a housing including means for maintaining the first electrode and the second electrode in spaced relationship to one another and electrically insulated from one another, the said electrodes each possessing a broad face and an external contact area, the broad face of said electrodes defining a gap therebetween, the gap so defined including at least a narrow portion and a contiguous wider portion CHARACTERIZED IN THAT at least one of the electrodes possesses a higher electrical resistance from the external contact area to the narrow portion of the gap than its electrical resistance from the external contact area to the wider portion of the gap; wherein the difference between the electrical resistance from the external contact area to the narrow portion of the gap and the electrical resistance from the external contact area to the wider portion of the gap is from one Ohm to 10^3 Ohms.

4,020,399

VAPOR COOLING DEVICE FOR DISSIPATING HEAT OF SEMICONDUCTOR ELEMENTS

Toshio Suzuki, and Yoshiro Shikano, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

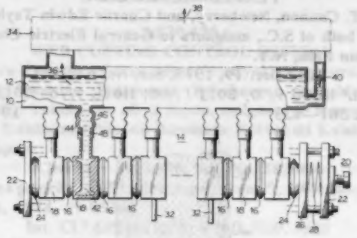
Filed Mar. 12, 1975, Ser. No. 557,892

Claims priority, application Japan, Mar. 15, 1974, 49-30410

Int. Cl.² H01L 23/34

U.S. Cl. 361—331 **6 Claims**

1. A vapor cooling device for cooling heat generator means, comprising, in combination, a coolant reservoir having a condensible coolant in the form of a liquid phase therein, at least one heat generation element disposed below said coolant reservoir, at least two heat dissipation blocks abutting against opposite sides of said heat generation element, each of said heat dissipation blocks including a hollow space therein, a fastening mechanism connecting said at least two heat dissipation blocks together into a unitary structure, a plurality of connection tubes, one for each heat dissipation block and connecting said hollow space in each of said heat dissipation blocks to said coolant reservoir, said condensible coolant in its liquid phase filling said connection tubes and said hollow spaces in said heat dissipation blocks, and condenser means disposed in fluid communication relationship with said reservoir above said coolant whereby when said heat generation element generates heat sufficient to boil these portions of said



liquid coolant disposed in said hollow spaces in the adjacent heat dissipation blocks into its vapor phase, said coolant in the form of its vapor phase enter said condenser means through said connection tubes and said coolant reservoir and is condensed into its liquid phase, said condensed coolant being returned to said coolant reservoir.

4,020,400

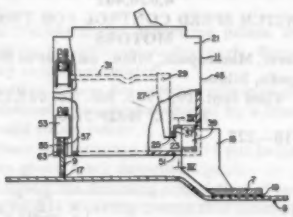
INTEGRATED CIRCUIT BREAKER PANELBOARD

George F. Hawkes, Jr., LaPalma, Calif., and Willis A. Speck, Trumbull, Conn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 488,605, July 12, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,099

Int. Cl.² H02B 1/04

U.S. Cl. 361—353 **2 Claims**



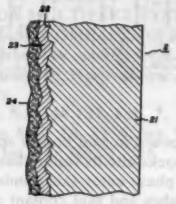
1. An integrated panelboard and circuit breaker system for connection to load conductors comprising a panelboard and at least one circuit breaker, the circuit breaker comprising a neutral terminal clip, a load conductor having a load terminal and a line terminal clip, the load conductor being releasably connected to the line terminal, the circuit breaker also comprising a housing including a bottom edge wall and opposite end walls, the bottom edge wall and one end wall forming a first housing corner and having a first opening extending through the corner portions of the bottom edge and end walls, the bottom edge wall and the other end wall also forming a second housing corner and having a second opening extending through the corner portions of the bottom edge wall and other end wall; the panelboard comprising a line bus bar and a neutral bus bar, each line and neutral bus bar having spaced stab terminals, the stab terminals being planar and disposed in a plane normal to the longitudinal axis of the bus bars, the line and neutral terminal clips being located within the housing and aligned with the corresponding openings and being detachably connected to one stab terminal of the line bus bar and to one stab terminal of the neutral bus bar, said stab terminals extending into the openings of the housing, and the

detachable connections between the stab terminals and the clips comprising the only mounting means of the circuit breaker on the panelboard.

4,020,401
ELECTROLYTIC CAPACITOR HAVING A SILVER PLATED NICKEL CASE

Henry T. Cannon, Newberry, and Charlie Edwin Taylor, Gilbert, both of S.C., assignors to General Electric Company, Hudson Falls, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,375
Int. Cl.² H01G 9/00; B01J 17/00; H01G 9/16; H01J 5/00
U.S. Cl. 361—433 **10 Claims**

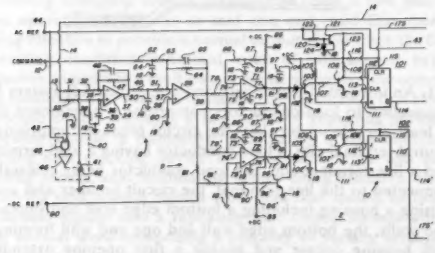


1. A cathode casing for an electrolytic capacitor, said casing comprising:
- an outer generally cup-shaped nickel bearing casing member having at least one open end and having a contoured interior surface;
- a layer of thin silver plating adhering to said interior surface, said plating substantially following the contour of said interior surface; and
- a porous layer of particles of a platinum group metal overlying and bonded to said silver plating, the contour of said interior surface acting to enhance the adhesion of said particles to said silver plating.

4,020,402
AC SWITCH SPEED CONTROL FOR TWO PHASE MOTORS

John F. Storm, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 19, 1975, Ser. No. 615,159
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **10 Claims**

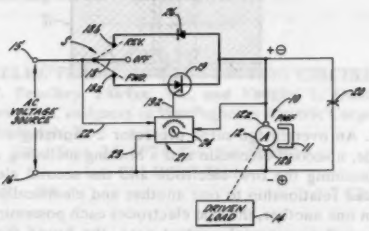


1. In a servomechanism system including condition altering apparatus energizable with current supplied by an alternating voltage source, means for producing a feedback signal indicative of operation of the apparatus, and input means for combining the feedback signal with a command signal indicative of desired operation of the apparatus to produce an error signal, improved circuitry for controlling the average energization current supplied to the apparatus, comprising:
- pulse width modulation means connected to receive the error signal and operable to produce a first pulse train in which the ratio of pulse duration to pulse repetition interval varies in accordance with the error signal;
- synchronization means connected to receive the first pulse train and operable to produce a second pulse train in which pulse duration and repetition interval are substantially equal to pulse duration and repetition interval in the first pulse train, and in which the leading and trailing edges of the pulses are variably delayed to occur in a fixed time relationship with instants of zero energization voltage; and
- current control means connected to receive the second pulse train and operable to supply energization current to the condition altering apparatus only during pulses of the second pulse train, whereby the apparatus is supplied with periodic bursts of alternating energization current beginning and ending in a fixed time relationship with instants of zero energization voltage, the average value of energization current depending on the error signal.

4,020,403
REVERSING CONTROL FOR DC. MOTORS OF THE PERMANENT MAGNET FIELD TYPE

William A. Means, Rockford, Ill., assignor to Applied Motors, Inc., Rockford, Ill.

Filed Jan. 10, 1975, Ser. No. 540,126
Int. Cl.² H02P 7/08
U.S. Cl. 318—257 **2 Claims**



1. In a reversing control system for operating a dc. motor from an ac. supply, the combination comprising
- a. a single pole, double throw switch,
- b. means including a controlled half-wave rectifier establishing a first circuit from the ac. supply through the motor armature via said switch when the latter is in a first position,
- c. means including a diode half-wave rectifier establishing a second circuit from the ac. supply through the motor armature via said switch when the latter is in a second position, said diode being oppositely poled in relation to said controlled rectifier, and
- d. means for applying an adjustable control signal to said controlled rectifier to vary the angle of conduction thereby during forward half waves,

whereby said motor runs at an adjustable speed in one direction when said switch is in its first position but runs at a high speed in the opposite direction when said switch is in its second position.

4,020,404
SYSTEM FOR CONTROLLING MOTOR SPEED

Richard Wilke, Am Weissenfeld 4, 583 Schwelm, and Helmut Korthaus, Fernblick 3, 56 Wuppertal-Barmen, both of Germany

Filed Apr. 23, 1975, Ser. No. 570,583
Claims priority, application Germany, Apr. 24, 1974, 2419744
Int. Cl.² H02P 5/06
U.S. Cl. 318—318 **7 Claims**

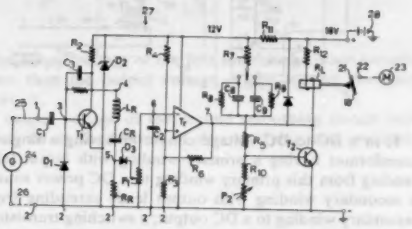
1. An apparatus for controlling the rotation speed of a shaft driven by a motor, said apparatus comprising:
- a nonmagnetic disk carried on said shaft and having an outer periphery;

a regularly undulated ferromagnetic ring carried on said outer periphery and forming a plurality of magnetically detectable and angularly equispaced regions thereon;

a detector head fixed adjacent said ring and having a magnetic coil, whereby rotation of said shaft displaces said regions past said head and causes said coil to generate a generally sinusoidal signal having a frequency corresponding to the rotation speed of said shaft;

means connected to said head and including a diode for clipping said sinusoidal signal and thereby forming a succession of pulses of like amplitude;

amplifier means connected to the clipping means and including a transistor, a zener diode connected across said transistor, and a capacitor connected between said transistor and said coil increasing the amplitude of said succession of pulses;



filter means including a resonant circuit connected to said amplifier means and receiving the amplified clipped pulses for producing a sinusoidal output only when the frequency of said amplified clipped pulses lies within a predetermined range;

detector means including a capacitor and a diode connected to said filter means for converting said sinusoidal output into a direct-current voltage signal; and

switch means connected between said detector means and said motor operable by said voltage signal when same exceeds a predetermined threshold value to alter the rotation speed of said motor, said switch means including a Schmitt trigger and a relay connected thereto.

4,020,405

PIPE-CUTTING AND/OR WELDING MACHINE WITH CLAMPING MOTOR TORQUE LIMITING CONTROL

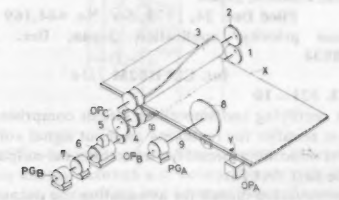
Günter Schumann, Ober Roden, Messenhausen, and Werner Becker, Liederbach, both of Germany, assignors to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed May 1, 1975, Ser. No. 573,753

Claims priority, application Germany, May 25, 1975, 2425349

Int. Cl.² B23K *37/04*; H02P *7/00*

U.S. Cl. 318—432 **4 Claims**



1. In a machine for pipe-cutting or welding and the like including a pipe-turning device having a chuck with pipe engaging jaws operated by an actuating device for moving the jaws into and out of engagement with the pipe, the improvement being said activating device having torque limiting means, said torque limiting means including adjusting means for selectively switching to a low torque value for causing said jaws to clamp the pipe and to a high torque value for causing said jaws to be released from the pipe.

4,020,406

WEB CUTTING CONTROL SYSTEM

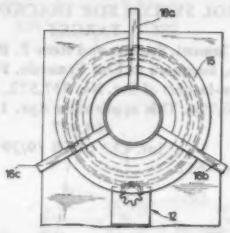
Masateru Tokuno, Nishinomiya; Masayuki Matsuura, Yokohama; Noboru Shinmura, Yokohama, and Masayoshi Kaneko, Yokohama, all of Japan, assignors to Rengo Kabushiki Kaisha and Nippon Riraiansu Kabushiki Kaisha, both of, Japan

Filed May 29, 1975, Ser. No. 582,406

Claims priority, application Japan, June 7, 1974, 49-65416; Aug. 16, 1974, 49-95260

Int. Cl.² G05B *19/26*; B26D *5/20*, *5/40*

U.S. Cl. 318—600 **1 Claim**



1. A control system for cutting a web fed at a constant speed by means of a rotary cutter driven by a motor selectively either into predetermined lengths or at fixed positions thereof, said control system comprising in combination:

a. first transducer for generating pulses, the number thereof being proportional to the length of the web which has been fed;

b. a second transducer for generating pulses, the number thereof being proportional to the angle through which said rotary cutter has rotated;

c. a first setting means for setting reference pulses, the number thereof being predetermined by a fixed rotating angle of said rotary cutter;

d. a first sensor for detecting the marks put beforehand on the web to give a mark detection signal;

e. a second sensor for detecting completion of each cutting operation to give a cutting completion detection signal;

f. a third sensor for giving a mark distance discriminating signal for discrimination whether the detection of the next mark occurs before or after the completion of cutting on the last mark;

g. a second setting means for digitally setting selectively either a desired cutting length or the distance between the mark detection point and the cutting completion detection point;

h. a first reversible counting means responsive to a detection signal from said first sensor for counting any difference between the value preset on said first setting means and the value preset on said second setting means;

i. an addition/subtraction discriminating means for comparing the value from said first setting means with the value from said second setting means to couple said difference between said two values to said first reversible counting means as a signal to be added or a signal to be subtracted according to the result of comparison;

j. said first reversible counting means receiving the pulses from said first transducer as a signal to be subtracted and the pulses from said second transducer as a signal to be added as well as the difference between said two values and performing reversible counting thereof;

k. a differentiating means for obtaining any difference be-

tween the result of said reversible counting by said first reversible counting means and a voltage proportional to the web feed speed;

l. a motor speed control means for discriminating the polarity of the output voltage from said differentiating means and controlling the speed of the motor for driving the rotary cutter according to the polarity and quantity of said output voltage; and

m. a second reversible counting means for subtracting from the preset value on said first sensing means a value corresponding to the length of the web which has been fed from the instant of detection by said first sensor to the instant of detection by said second sensor, in case the mark detection signal from said first sensor arrives inn advance of the cutting completion detection signal from said second sensor after the mark distance discriminating signal has come from said third sensor.

4,020,407

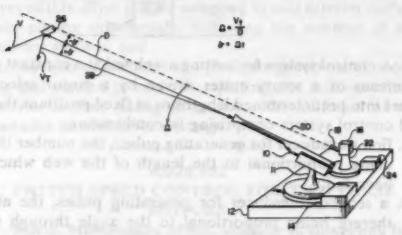
CONTROL SYSTEM FOR TRACKING A MOVING TARGET

Gilbert L. Clement, Seneac, and Rene F. Buttman, Soues, both of France, assignors to Etat Francais, France

Continuation-in-part of Ser. No. 337,572, March 2, 1973, Pat. No. 3,840,794. This application Apr. 15, 1974, Ser. No. 460,997

Int. Cl.² G05B *19/29*

U.S. Cl. 318—632 **7 Claims**



1. Sighting and aiming control apparatus for automatically positioning a system for tracking a moving object, the tracking system including a support, an aiming section rotatably mounted on the support, and a sighting section, having a movable sighting axis, said sighting section being rigidly mounted on and rotated with said aiming section, said sighting and aiming control apparatus comprising a digital electronic means for determing an aiming angle and an aiming angle correction including a frequency generator for producing a pulse output corresponding to the relative angular position of the object; first means controlled by said digital electronic means for positioning the aiming section to the aiming angle determined by said digital electronic means and for varying the position of the aiming section by the aiming angle correction relative to said aiming angle in the direction of the target motion; second means controlled by said digital electronic means for varying the position of the sighting axis of the sighting system by an angle equal to the aiming angle correction in a direction opposite to the direction of the target motion; third means for producing a pulse output corresponding to the angular position of the aiming section; fourth means for comparing the pulse output produced by said frequency generator and said third means and for producing a digital output corresponding to the comparison; fifth means for generating a digital output representative of the desired aiming angle correction; sixth means for comparing the outputs of said fourth means and said fifth means and for applying a signal corresponding to said comparison to said first means for the control thereof; and seventh means for applying said digital output of said fifth means to control said second means.

4,020,408

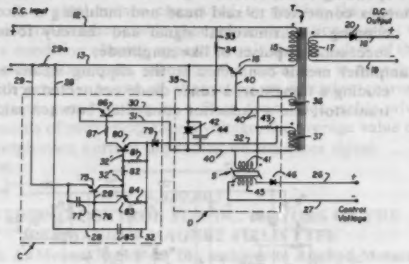
PULSE WIDTH MODULATED DC-TO-DC POWER CONVERTER USING A SINGLE ENDED TRANSFORMER

Jon H. Grant, Fullerton, Calif., assignor to Etatech, Inc., Placentia, Calif.

Filed Oct. 2, 1975, Ser. No. 618,738

Int. Cl.² H02P *13/22*; H02M *1/18*

U.S. Cl. 321—2 **15 Claims**



1. In a DC-to-DC voltage converter having a single-ended transformer having a primary winding with intput leads extending from this primary winding to a DC power source and a secondary winding with output leads extending from this secondary winding to a DC output; a switching transistor in an input lead to switch the transformer on and off responsive to voltage changes at the base of the transistor; a rectifier means in an output lead to restrict the output of a DC voltage and a drive circuit connecting with the base of the switching transistor to produce a cyclic voltage at the transistor base whereby a positive square wave is obtained at the DC output, the improvement comprising:

a. a drive winding at the transformer to initiate voltages in opposite directions as the transformer turns on and off responsive to energy stored in the transformer core;

b. a regenerative winding at the transformer in the drive circuit lead between the aforementioned drive winding and the switching transistor base opposing the drive winding and having fewer turns than the drive winding whereby, when the transistor is "on" the voltage generated by the drive winding overwhelms the voltage generated by the regenerative winding to provide the "on" voltage at the switching transistor base; and

c. a control means including a shunt lead which shunts the drive winding, adapted to actuate in a cyclic manner to first close the shunt lead to drop the drive winding voltage to permit the voltage induced in the regenerative winding to turn "off" the switching transistor and thereafter open the shunt lead to turn "on" the switching transistor, producing the aforementioned positive square wave output.

4,020,409

RECTIFYING AND SMOOTHING CIRCUIT

Yukinobu Ishigaki, Yamato, and Kohei Sasamura, Sagamihara, both of Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Dec. 24, 1975, Ser. No. 644,169

Claims priority, application Japan, Dec. 27, 1974, 49-148934

Int. Cl.² H02M *1/14*

U.S. Cl. 321—10 **4 Claims**

1. A rectifying and smoothing circuit comprising:

a first rectifier for rectifying an input signal voltage;

a first smoothing circuit for smoothing the output voltage of the first rectifier;

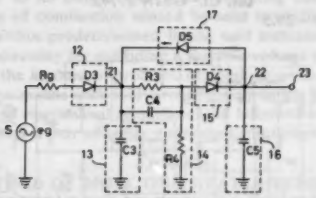
an attenuation circuit for attenuating the output voltage of the first smoothing circuit;

a second rectifier for rectifying voltage passing through the attenuation circuit;

a second smoothing circuit for smoothing the output voltage of the second rectifier; and

a feedback circuit for feeding back to the output voltage of the second smoothing circuit to the first smoothing circuit,

said second smoothing circuit, after being charged at a specific voltage, being held at said charging voltage until



the output voltage of the first smoothing circuit becomes less than the output voltage of the second smoothing circuit,

the output voltage of the second smoothing circuit being derived as the output of the rectifying and smoothing circuit.

4,020,410

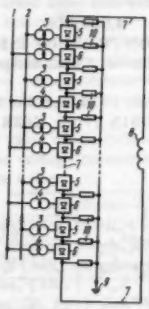
RECTIFIER-INVERTER SYSTEM OF CONVERTER SUBSTATION

Viktor Ivanovich Emelyanov, prospekt Engelsa, 40, kv. 40; Khaim Shlemovich Grois, Lesnoi prospekt, 15, kv. 38, and Dmitry Evgenievich Kadomsky, prospekt Nauki, 6/1, kv. 58, all of Leningrad, U.S.S.R.

Filed Nov. 25, 1975, Ser. No. 635,037

Int. Cl.² H02M *1/18*

U.S. Cl. 321—11 **1 Claim**



1. A rectifier-inverter system of a converter substation for transmitting energy between a.c. networks operating at different frequencies, comprising one or more pairs of rectifier and inverter converters connected in series to a common d.c. circuit so that said rectifier and inverter converters integrate, the poles of at least one rectifier or inverted converter being connected to a protective grounding via resistor-capacitor elements.

4,020,411

STATIC POWER CONVERTER CONTROLLING APPARATUS FOR REDUCING NOISE GENERATED BY PHASE SHIFT CONTROL

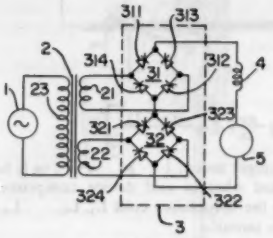
Takashi Tsuboi, Katsuta; Kyozo Tachibana, Naka; Kaoru Tamura, Hitachi, and Fujimaro Imaizumi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

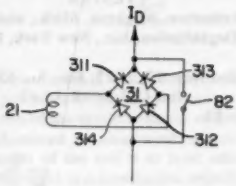
Filed Feb. 21, 1975, Ser. No. 551,663

Claims priority, application Japan, Feb. 21, 1974, 49-20669

Int. Cl.² H02M *1/00*

U.S. Cl. 321—27 R **4 Claims**





1. In a static power converter comprising a transformer having a number of separate secondary coils, a converter assembly driven to its full output and consisting of a number of thyristor bridges for the bilateral conversion of A. C. power into D. C. power and vice versa, each of which is connected to one of these secondary coils and all of which are connected in series configuration on the D. C. side, the improvement comprising

a device for the phase shift control of the thyristor bridges in dependence on a control voltage, the level of this control voltage being detected by a level detector and a signal generated in accordance with said level by means of which the output D. C. voltage of one thyristor bridge is maintained at zero, whereas another thyristor bridge operates with phase shift control.

4,020,412

HIGH-EFFICIENCY TRANSFER OF MAGNETIC ENERGY

Christian Rioux, Cachan, and Michel Legentil, Orsay, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Meuilly Sur Seine, France

Filed July 19, 1973, Ser. No. 380,654

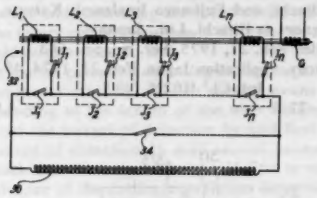
Claims priority, application France, July 21, 1972, 72.26338

Int. Cl.² G05F *7/00*

U.S. Cl. 323—43.5 R **20 Claims**

1. A device for the high-efficiency transfer of magnetic energy contained in a storage inductance coil into a load inductance coil, wherein the storage inductance coil has a fixed value L and wherein the load inductance coil is constituted by *n* partial-inductance coils of values $L_1, L_2, \ldots L_n$ which are connected in series and in total coupling by mutual

induction, the value L_p of the p^{th} of the $(n-1)$ first inductance coils $L_1, L_2, \ldots L_{n-1}$ being in the vicinity of:



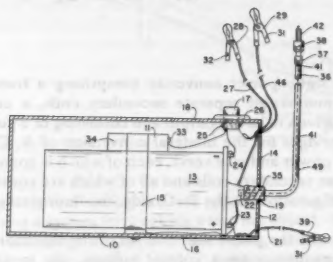
$$L_p = L\left[tg\frac{\pi p}{2n} - tg\frac{\pi(p-1)}{2n}\right]^2$$

where p is an integer index, 1 p $n-1$, tg is tangent and L a constant and wherein said device comprises switching means whereby the inductance coils $L_1, L_2, \ldots L_{n-1}$ are progressively put in circuit.

4,020,413
EMERGENCY AUTO IGNITION KIT AND SPARK PLUG TESTER

Edward P. Wetherbee, Brighton, Mich., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 17, 1975, Ser. No. 632,444
Int. Cl.² G01R 13/42
U.S. Cl. 324—15 **1 Claim**



1. A device which alternately serves for emergency use as a replacement engine ignition coil or as a spark plug tester, comprising

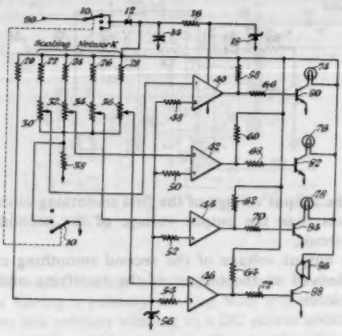
a housing enclosing a condensor and an ignition coil, with a sleeve extending through the housing located adjacent the high tension terminal of the said ignition coil, with a first and a second flexible insulated wire each externally attached to an individual clamp and each wire extending into the housing and connected to both a first low tension lead of the said ignition coil and to a first terminal of the said condenser, together with a third flexible insulated wire externally attached to a clamp and extending into the housing and connected to a first terminal of a normally closed momentary contact switch mounted in a housing wall,

said switch connected through its second terminal to the second terminals respectively of both the coil and condenser, together with a length of flexible high tension insulated ignition cable, one end of which is fastened to a sleeve of a size to fit over a body of a spark plug and the other end of which is shaped to attach to the conductor of the coil when fitted through the sleeve in the housing, so that when a sparkplug is attached in the sleeve of the ignition cable, the conductor of the ignition wire is in contact with the terminal of the sparkplug.

4,020,414
PLURAL COMPARATOR INDICATOR OF BATTERY VOLTAGE

Alfredo E. Paredes, Miami, Fla., assignor to Konar Corporation, Miami, Fla.

Filed Jan. 31, 1975, Ser. No. 546,099
Int. Cl.² G01N 27/42
U.S. Cl. 324—29.5 **1 Claim**



1. A battery charge capacity indicator for providing an indication of charge capacity of said battery comprising:

a pair of battery connecting terminals;

voltage divider network means connected to said battery connecting terminal;

a plurality of voltage comparators, each comparator having a first input individually connected to one of said branches of said voltage divider network means;

means connected to said battery connecting terminals for providing a reference voltage, said reference voltage means connected as a second input to each of said volatage comparators;

a plurality of biased switching means, each switching means connected to a different output of each of said voltage comparators which provides an input signal to bias individual switching means;

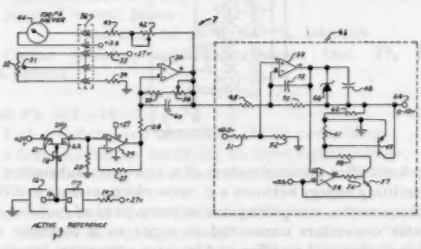
a plurality of indicating means, each individual indicator means connected to a different biased switching means,

circuit switching means connected to said battery connecting terminals having a first, second and third position providing a on-off test position of said circuit.

4,020,415
COMBUSTION PRODUCT INDICATOR

William Webb, Jr., Denver, Colo., assignor to Unitec, Inc., Denver, Colo.

Filed Dec. 30, 1974, Ser. No. 537,300
Int. Cl.² G01N 27/62; G08B 17/12
U.S. Cl. 324—33 **8 Claims**



1. A combustion product indicating device, comprising: ionization detection means providing an output indicative of products of combustion sensed by said detection means; a

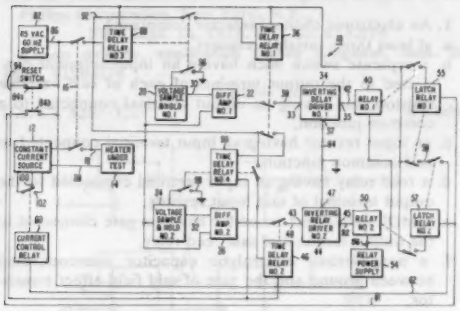
field effect transistor for receiving said output from said ionization detection means and providing an output reflective thereof; at least one operational amplifier connected to receive said output from said field effect transistor, said operational amplifier also receiving a reference voltage; and indicator means connected with said operational amplifier and responsive to an output therefrom indicating the amount of products of combustion sensed by said ionization detection means within predetermined limits, said indicator means including circuitry for providing a variable voltage output indicative of the amount of products of combustion sensed by said ionization means with said circuitry including a pair of series connected operational amplifiers, the latter of which is connected with a pair of series connected transistors.

4,020,416

METHOD OF DETECTING HEATER RESISTANCE INDEPENDENT OF CONTACT RESISTANCE

James Gunard Ottos, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed May 20, 1976, Ser. No. 688,475
Int. Cl.² G01R 27/14
U.S. Cl. 324—64 6 Claims



1. A method of detecting a nominal resistance value of a heater element in an electron tube, independent of measurement connection contact resistance, wherein said heater element has a resistance the value of which is equal to one of at least two nominal values, said method comprising the steps of:

a. applying, at a first time, a first level of constant current through said heater;

b. measuring, at a second time, a first voltage across said heater, said second time following said first time by a predetermined interval;

c. measuring, at a third time, a second voltage across said heater and determining the difference between said first and said second voltage measurements, said third time following said second time by a predetermined interval; and

d. comparing the value of the difference between said first and said second voltage measurements with a predetermined reference value.

4,020,417

SOIL MOISTURE INDICATOR DEVICE

Alfred W. Brehob, Laguna Beach, and Carlos E. Wheeler, Costa Mesa, both of Calif., assignors to Turf Service Laboratories, Inc., Stanton, Calif.

Filed Nov. 26, 1975, Ser. No. 635,389
Int. Cl.² G01R 27/02; G01N 27/02
U.S. Cl. 324—65 R 7 Claims

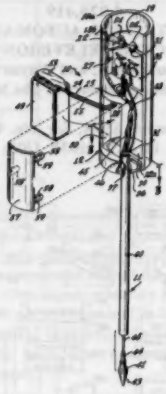
1. An indicating device for testing the moisture content of soil about the roots of a plant comprising:

a power supply,

a first indicator circuit connected across said power supply and including a first semiconductor switching means in series with a first indicator light,

a second indicator circuit connected across said power supply and including a second semiconductor switching means in series with a second indicator light,

control circuit means connected across said power supply with its current path completed through the soil to be tested, said control circuit means comprising an unbalanced resistive bridge having junctions on the opposite sides thereof respectively providing output voltages for controlling said first and second semiconductor switching means,



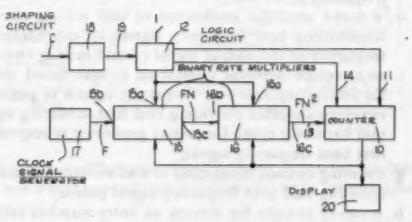
whereby said control circuit means adjusts the output voltages on said junctions in response to the resistivity of the soil to cause one of the semiconductor switching means to conduct to illuminate its associated indicator light if the moisture content of the soil is at least adequate and to cause the other said semiconductor switching means to conduct to illuminate its associated indicator light if the moisture content of the soil is excessive.

4,020,418

APPARATUS FOR GENERATING A DIGITAL COUNT PROPORTIONAL TO AN INPUT FREQUENCY

Robert Graham Burrage, Solihull, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Nov. 14, 1975, Ser. No. 632,001
Claims priority, application United Kingdom, Nov. 21, 1974, 50453/74
Int. Cl.² G01R 23/02
U.S. Cl. 324—78 D 12 Claims



1. An apparatus for generating a digital count which is proportional to the frequency of a pulsed input signal, comprising means for generating a reference signal of a known frequency, a digital counter, two binary rate multipliers each of which is connected to receive the count in said counter as a first signal, a first one of said multipliers having said reference signal as a second input signal and a second one of said multipliers having the output signal from said first multiplier as a second input signal, said second multiplier being responsive to its first and second input signal to provide a first output

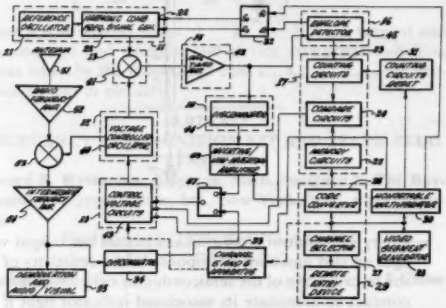
signal and being connected to said counter so that the count therein can be altered in response to said first output signal, and control means, responsive to predetermined points in a cycle of said pulsed input signal, for causing said count to be so altered and for arresting the alteration of said count.

4,020,419

ELECTRONIC SYSTEM FOR AUTOMATICALLY TUNING TO A SELECTED TELEVISION CHANNEL

Fred W. Caspari, South Bend, and Wayne C. Johnson, Columbia City, both of Ind., assignors to The Magnavox Company, Fort Wayne, Ind.

Filed June 5, 1974, Ser. No. 476,503
Int. Cl.² H03B 3/08
U.S. Cl. 325—421 **1 Claim**



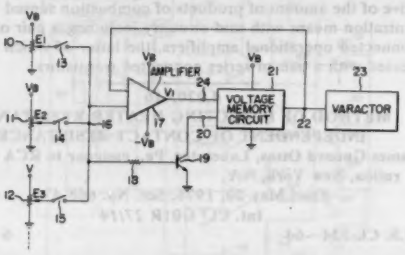
1. An electronic system for tuning a receiver to a selected television channel comprising:
   a. a voltage controlled oscillator;
   b. a voltage signal generator for sweeping and holding the frequency of said oscillator;
   c. a harmonic comb frequency generator for generating a first plurality of signals at 24 MHz frequency intervals, and a second plurality of signals at 6 MHz frequency intervals, said first plurality of signals being generated in response to a channel selection signal, said second plurality of signals being generated in response to a first actuating signal;
   d. a mixing circuit for heterodyning the output signal of said oscillator with the output signal of said harmonic comb frequency generator;
   e. a tuned amplifier connected to said mixing circuit for transmitting beat frequency signals of a predetermined frequency in the output signal of said mixing circuit;
   f. an envelope detector connected to said tuned amplifier for converting said beat frequency signals to pulses, said envelope detector providing said first actuating signal to said harmonic comb frequency generator in response to a first beat frequency signal;
   g. counting circuits connected to said envelope detector for counting said beat frequency signal pulses;
   h. memory circuits for storing an entry number related to said selected television channel;
   i. compare circuits for comparing said beat frequency pulse count in said counting circuits with said entry number in said memory circuits and for applying a second actuating signal to said voltage signal generator for stopping frequency sweeping of said oscillator when a preestablished relationship between said entry number and said pulse count exists; and
   j. a discriminator continuously coupled between said tuned amplifier and said signal generator and cooperative therewith for stabilizing said oscillator frequency.

4,020,420

ELECTRONIC CHANNEL SELECTOR

Shunji Minami, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 17, 1976, Ser. No. 667,560
Claims priority, application Japan, Mar. 20, 1975, 50-34158; May 13, 1975, 50-56941
Int. Cl.² H04B 1/16
U.S. Cl. 325—464 **3 Claims**



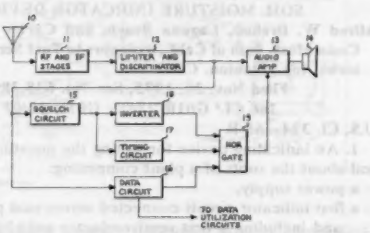
1. An electronic channel selector comprising
   a. at least three variable resistors,
   b. a separate switch each having an input terminal connected to the output terminal of each of said variable resistors and having an output terminal connected to a common junction,
   c. an input resistor having an input terminal connected to said common junction,
   d. a reed relay having an input terminal connected to the output terminal of said input resistor,
   e. a MOS field-effect transistor having a gate connected to the output terminal of said reed relay,
   f. a nonpolarized electrolytic capacitor interconnected between ground and the gate of said field-effect transistor,
   g. an output resistor interconnected between the source of said field-effect transistor and the ground,
   h. switching means having an input terminal connected to the common junction and an output terminal connected to one end of the coil of said reed delay for energizing said relay coil to close said reed relay in response to current through any of said separate switches, and
   i. a varactor responsive to the source-follower voltage of said field-effect transistor.

4,020,421

MUTING CIRCUIT

James H. Elder, Brookneal, and Hubert A. Patterson, Lynchburg, both of Va., assignors to General Electric Company, Lynchburg, Va.

Filed Mar. 23, 1976, Ser. No. 669,634
Int. Cl.² H04B 1/10
U.S. Cl. 325—478 **6 Claims**



1. In a radio receiver for receiving radio frequency signals

modulated by audio signals or data pulses, said receiver having means for detecting said radio frequency signals, means connected to said detecting means for producing a squelch signal in the absence of radio frequency signals and an unsquelch signal in the presence of radio frequency signals, and means connected to said detecting means for producing output signals in response to said detected audio modulated radio frequency signals, an improved arrangement comprising:

a. a timing circuit for connection to said squelch signal producing means to produce a timing signal of predetermined time duration in response to an unsquelch signal;

b. means for connection to said radio frequency detecting means for producing a data signal in response to presence of said data pulses in said detected radio frequency signals;

c. and means for connecting said timing circuit and said data signal producing means to said output signal producing means for blocking output signal production in response to either said timing signal or said data signal.

4,020,422

PHASE AND/OR FREQUENCY COMPARATORS

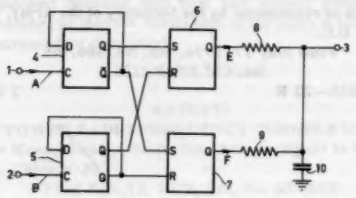
Michael James Underhill, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 16, 1975, Ser. No. 613,814

Claims priority, application United Kingdom, Sept. 26, 1974, 41904/74

Int. Cl.² H03B *3/04*

U.S. Cl. 328—133 **8 Claims**



1. Apparatus for determining the phase difference between first and second input signals, each having a cyclically repetitive waveform, over a phase difference range of $n \times 360°$ wherein n is an integer greater than one, comprising: a sequence of n phase comparators each responsive to a respective one of n consecutive waveforms of each of the two signals to provide repetitive output pulses having a width representative of the phase difference between the two respective waveforms, and signal combining means which combines the said output pulses of the comparators and provides a combined signal whose time-averaged magnitude is dependent upon the phase difference between the two input signals.

4,020,423

METHOD AND CIRCUIT ARRANGEMENT FOR PRODUCING AND TRANSMITTING ELECTRICAL REFERENCE PULSES

Volker Guyot, Klein-Gerau; Paul Holdinghausen, and Martin Mueller, both of Bickenbach, all of Germany, assignors to Carl Schenck AG, Darmstadt, Germany

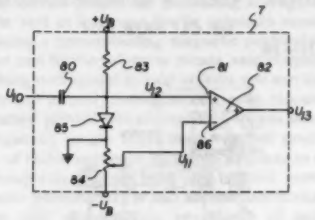
Division of Ser. No. 506,108, Sept. 16, 1974, Pat. No. 3,976,947, which is a division of Ser. No. 250,727, May 5, 1972, Pat. No. 3,852,673. This application Apr. 28, 1975, Ser. No. 572,624

Claims priority, application Germany, May 10, 1971, 2122967

Int. Cl.² H03K *5/20*

U.S. Cl. 328—151 **1 Claim**

1. A circuit arrangement for producing electrical reference signals and transmitting such reference signals to an output terminal, comprising a source signal generator, a comparator circuit having a predetermined switching characteristic, an input circuit for connecting said source signal generator to said comparator circuit, said input circuit comprising a capacitor connected between the source signal generator and one input of said comparator circuit, and a diode connected between said one input of the comparator circuit and ground whereby a peak amplitude of a source signal is stored in said



capacitor and supplied sequentially with said source signal to said one input of the comparator circuit, said input circuit further comprising adjustable bias means connected to another input of said comparator circuit for applying a reference signal value to said other input, whereby said reference signals are produced at said output terminal in accordance with said predetermined switching characteristic and in response to the maximum amplitude of a source signal produced by said source signal generator.

4,020,424

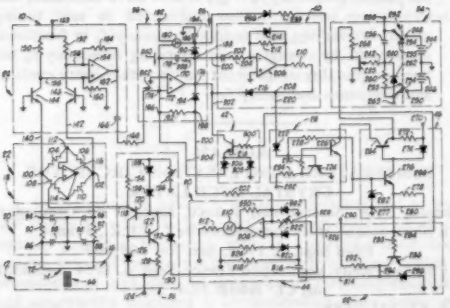
ACTIVE DIFFERENTIAL FILTER NETWORK

Neal M. Burdick, 6371 Celia Vista Drive, San Diego, Calif. 92115

Continuation-in-part of Ser. No. 421,025, Dec. 3, 1973, Pat. No. 3,914,701, which is a continuation-in-part of Ser. No. 294,380, Dec. 2, 1972, Pat. No. 3,818,341. This application Oct. 20, 1975, Ser. No. 623,915

Int. Cl.² H04B *15/00*

U.S. Cl. 328—167 **3 Claims**



1. An active differential filter network receiving an input signal and a bias control signal and providing an output signal, comprising:

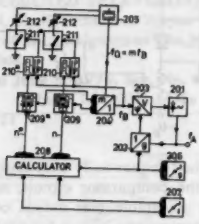
bridge network means having a pair of input-output junctions and a pair of control junctions, the input signal and an output signal being connected to the input-output junctions;

operational amplifier means having an inverting and a non-inverting input and an output, the inverting input being connected to one of the control junctions and the output being connected to the other control junction of the bridge network means, the bias control signal being connected to the non-inverting input of the operational amplifier means.

4,020,425
DIGITAL SETTABLE FREQUENCY GENERATOR WITH PHASE-LOCKING LOOP

Günther Hoffmann, and Peter Harzer, both of Eningen, Germany, assignors to Wandel u. Goltermann KG, Reutlingen, Germany

Filed Mar. 26, 2976, Ser. No. 670,714
Claims priority, application Germany, Mar. 29, 1975, 2513948
Int. Cl.² H03B *3/04*
U.S. Cl. 331—16 **13 Claims**



1. A frequency generator comprising:

a source of variable reference frequency f_B including an adjustable master oscillator of operating frequency $f_Q = smf_B$, said master oscillator being provided with tuning means, and a fixed first frequency divider with an integral step-down ratio m:1 driven by said master oscillator, s being an integer not greater than 2;

a continuously adjustable slave oscillator provided with a phase-locking loop including a phase comparator;

a digitally settable second frequency divider with an integral step-down ratio g:1 driven by said slave oscillator, said phase comparator having inputs respectively connected to said first and second frequency dividers for receiving therefrom respective oscillations of said reference frequency f_B;

integral selector means connected to said second frequency divider for changing the division factor g thereof to vary the output frequency $f_A = gf_B$ of said slave oscillator; and

interpolating selector means connected to said tuning means for varying said output frequency f_A in fractional increments by changing said operating frequency f_Q between a plurality of different values within every cycle of said reference frequency f_B.

4,020,426
TEMPERATURE COMPENSATION CIRCUIT FOR CRYSTAL OSCILLATOR

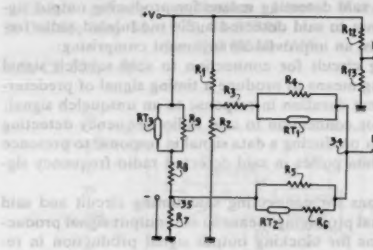
Jacques Hellé, Sartrouville, France, assignor to Compagnie d'Electronique et de Piezoelectricite C.E.P.E., France

Filed Sept. 2, 1975, Ser. No. 609,809
Claims priority, application France, Sept. 6, 1974, 74.30338
Int. Cl.² H03B *5/04, 5/32*
U.S. Cl. 331—158 **5 Claims**

1. A crystal-controlled oscillator whose frequency can be regulated within a wide range of temperatures and which comprises:

an oscillating circuit in the form of a feedback loop, comprising an amplifier, a piezo-electric oscillator, and an element with a first pair of terminals, said element having a reactance which is variable as a function of an electrical signal applied to its terminals; and

a compensating circuit with a second pair of terminals comprising temperature-sensitive elements, an electrical characteristic of which depends upon the temperature, said compensating circuit delivering at its terminals a compensating electrical signal, said first pair of terminals being connected to said second pair, wherein one of the terminals of the said second pair, in operation, is maintained at a fixed potential by a voltage divider, and the other is at an applied potential which is variable as a function of the temperature, and a first and second of said temperature-sensitive elements are connected by one of

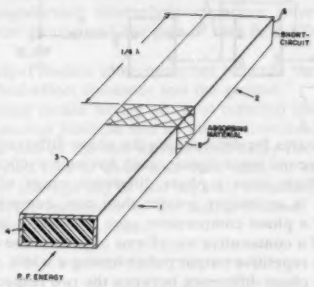


their ends to said other terminal, their other ends being respectively connected to two voltage dividers, of which one comprises a third one of said elements, the three dividers being adapted to be connected to the terminals of an electrical energy source.

4,020,427
FOAM MATCHING LOAD

William R. Connerney, Needham, and Denis L. Bourassa, Methven, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 17, 1976, Ser. No. 686,766
Int. Cl.² H01P *1/26*
U.S. Cl. 333—22 R **2 Claims**



1. A waveguide matched load device for a predetermined frequency of radiation comprising an elongated, rectangular cross-sectioned polystyrene foam dielectric material; a thin film of metallic material coating the outside of the elongated dimension of said material; one end of said material being shorted-circuited; an energy absorbing means connected at the other end of said material; and further means connected to said energy absorbing means to supply the predetermined frequency of radiation.

4,020,428
STRIPLINE INTERDIGITAL BAND-PASS FILTER

Larry O. Friend, Scottsdale, and John J. Lockwood, Tempe, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Nov. 14, 1975, Ser. No. 631,803
Int. Cl.² H01P *1/20, 3/08, 7/00, 1/16*
U.S. Cl. 333—73 S **23 Claims**

1. A high frequency, stripline band-pass filter having a housing member, comprising:

a first ground plane member;

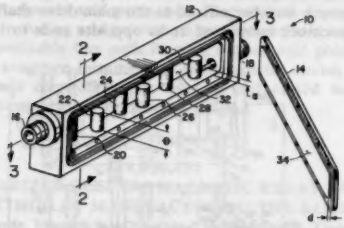
a second ground plane member spaced in parallel relationship to said first ground plane member;

a plurality of parallel-coupled resonators disposed between said first and second ground plane members;

input means for coupling input signals to the filter;

output means for coupling the output of the filter to a load; and

said first ground plane member being removably mounted to the filter housing member to facilitate interchanging of



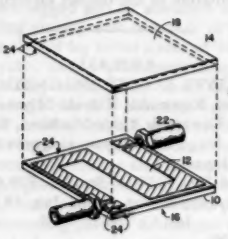
said first ground plane member with another ground plane member so dimensioned that the spacing between said plurality of parallel-coupled resonators and said first ground plane member is greater or less by a predetermined amount than the spacing between said plurality of parallel-coupled resonators and said second ground plane member whereby said resonators are unsymmetrically disposed between said first and second ground plane member so that the bandwidth of the filter is respectively increased or decreased.

4,020,429

HIGH POWER RADIO FREQUENCY TUNABLE CIRCUITS

Robert Henry Bickley, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Feb. 12, 1976, Ser. No. 657,665
Int. Cl.² H01P *1/20, 7/00, 3/08, 5/04*
U.S. Cl. 333—73 R **6 Claims**



1. A tunable high power radio frequency circuit apparatus, comprising in combination:

tuned printed circuit resonant means for providing a radio frequency output in response to an electrical input, said tuned printed circuit resonant means being tuned to a first predetermined range of radio frequency signals, said tuned printed circuit means comprising at least one radio frequency feedline means having a predetermined electrical length, said at least one radio frequency feedline means having a characteristic impedance equal to a predetermined external load impedance at a nominal operating frequency and wherein said characteristic impedance of said at least one feedline means is lower than said external load impedance at an operating frequency higher than said nominal operating frequency and wherein said characteristic impedance of said at least one feedline means is higher than said external load impedance at a frequency lower than said nominal operating frequency;

at least one ferrite substrate means for providing a variable magnetic permeability therein, said at least one ferrite substrate means having two opposed planar surfaces, one of said surfaces having a ground plane disposed thereupon, the other of said opposed planar surfaces being adjacent said tuned printed circuit resonant means; and

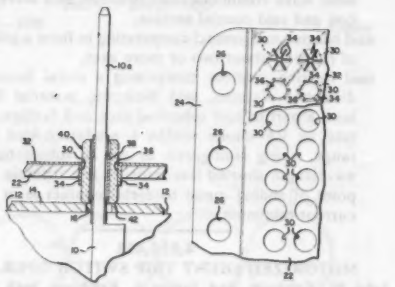
magnetic circuit means for producing a magnetic biasing field in said at least one ferrite substrate means and for producing a corresponding magnetic permeability in said at least one ferrite substrate means, said magnetic biasing field bing orthogonal to said at least one ferrite substrate means and to said tuned printed circuit resonant means, said tuned printed circuit resonant means being tunable to frequency ranges other than said first predetermined range of radio frequency signals in response to changes in said magnetic biasing field and in said corresponding magnetic permeability in said at least one ferrite substrate means, said characteristic impedance of said feedline means varying by means of said changes in said permeability of said ferrite substrate means.

4,020,430

FILTERED CONNECTOR ASSEMBLY WITH COMPOSITE GROUND PLANE

Eric Ernest Vander Heyden, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 572,540, April 28, 1975, abandoned.
This application Sept. 2, 1976, Ser. No. 720,162
Int. Cl.² H03H *7/14;* **H01R** *15/16, 15/14, 17/10*
U.S. Cl. 333—79 **4 Claims**



1. In a connector having a dielectric housing and at least one cavity in which is mounted a corresponding electrical contact provided thereover with an encircling filter body passing through an eletrically conducting foil sheet which is provided with a plurality of tines circumferentially encircling and electrically engaging a corresponding filter body, the improvement comprising:

a rigid metal plate connected to said housing and connected to said foil sheet to provide a composite ground plane,

said plate having at least one opening through the thickness thereof receiving a corresponding electrical contact and a corresponding filter body,

said tines being bent into receipt within said corresponding plate opening,

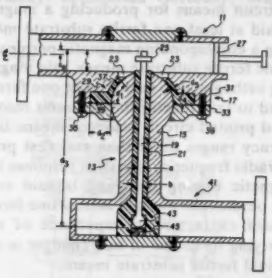
said tines being compressed between and nonyieldingly engaging both the periphery of the corresponding filter body and the thickness of said plate defining the periphery of a corresponding plate opening, the thickness of said plate providing a positive stop against which said tines are nonyieldingly engaged to resist deflection thereof away from said filter body.

4,020,431

MULTIAXIS ROTARY JOINT FOR GUIDED EM WAVES

Roger A. Saunders, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 15, 1976, Ser. No. 649,756
Int. Cl.² H01P 1/06, 1/16; H11P 5/08
U.S. Cl. 333—98 TN **6 Claims**



1. An electromagnetic wave guiding rotary joint comprising:
a coaxial line section whose outer conductor at one end is rigid and spherically configured to form a spherical journal, and whose inner conductor at the same end extends beyond the outer conductor a predetermined length,
a waveguide section having an aperture in one side,
a bearing member having a spherical race complementary with said spherical journal of said coaxial section, said bearing member being connected to said waveguide section and having an aperture in appropriate alignment with said waveguide side aperture, said bearing receiving said spherical journal such that the inner conductor extension protrudes into said waveguide and provides electromagnetic wave communication between said waveguide section and said coaxial section,
said bearing and journal cooperating to form a joint capable of rotation about two or more axes,
said bearing member comprising a metal housing and a dielectric material, said dielectric material forming at least a part of said spherical race and further, to constitute an RF choke within a predetermined frequency range, being configured to act as substantially a half wavelength shorted transmission line wherein the actual point of sliding metal to metal contact is at or near a current minimum.

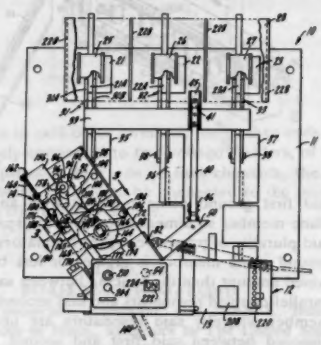
4,020,432

MOTORIZED SHUNT TRIP SWITCH OPERATOR

John W. Erickson, and James A. Erickson, both of Crystal Lake, Ill., assignors to Boltswitch, Inc., Crystal Lake, Ill.

Filed Aug. 25, 1975, Ser. No. 607,352
Int. Cl.² H01H 3/26, 3/28
U.S. Cl. 335—76 **4 Claims**

1. In a high-current low-voltage load break switch, of the kind comprising a fixed contact, a movable contact movable between a closed position in bolted pressure contact with the fixed contact and an open position displaced from the fixed contact, and a switch-operator mechanism for opening and closing the switch, the switch-operator mechanism including spring drive means for rapidly driving the movable contact to its closed position and to its open position, a main drive shaft rotationally reciprocable between a switch-closed position and a switch-open position, a drive connection between the main drive shaft and the spring drive means to actuate the spring drive means to close the switch in response to rotation of the main drive shaft through a given arcuate distance in a switch-closing direction toward its switch-closed position, and trip means for actuating the spring drive means to open the switch, a motor assembly for the switch operator mechanism comprising:
an electric motor;
an operating shaft;
first transmission means drivingly connecting the motor to the operating shaft to rotate the operating shaft in a given direction, the first transmission means including a mutilated ratchet element operatively connected to the operating shaft and defining a disengaged condition for the first transmission means at a first angular orientation of the ratchet element;
second transmission means, coupling the operating shaft to the main drive shaft of the switch operator, comprising a first crank member affixed to the operating shaft, a second crank member affixed to the main drive shaft, and a link member connected at its opposite ends to the first



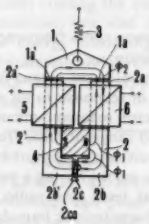
and second crank members to drive the second crank member and the main drive shaft in the switch-closing direction in response to rotation of the operating shaft in said given direction, the crank-link connection at one end of the link member permitting rotation of one crank member through a substantial arcuate distance without rotation of the other crank member;
an engagement device for rotating the mutilated ratchet element a limited distance in said given direction beyond said first angular orientation;
and an electrical circuit for energizing the motor, including a sensing switch for de-energizing the motor at a second angular orientation of the ratchet element.

4,020,433

RELEASE TYPE ELECTROMAGNETIC DEVICE

Masanori Uchidoi, Kawasaki; Hideaki Miyakawa, Inagi; Tetsuya Taguchi, Kawasaki; Yukio Mashimo, Tokyo, and Satoshi Watanabe, Inagi, all of Japan, assignors to Canon Kabushiki Kaisha, Japan

Filed Jan. 7, 1975, Ser. No. 539,048
Claims priority, application Japan, Jan. 18, 1974, 49-8308
Int. Cl.² H01F 7/08
U.S. Cl. 335—230 **8 Claims**



1. A release type electromagnetic device comprising, in combination, two relatively elongated, substantially rectilinear pole pieces arranged in spaced substantially parallel relation; a permanent magnet positioned between said pole pieces and having its magnetizing direction substantially perpendicu-

lar to the longitudinal extent of said pole pieces; a normally deenergized electromagnetic means operatively associated with said pole pieces and operable, when energized, to generate a magnetic flux opposing the magnetic flux of said permanent magnet; a movable magnetizable armature adjacent corresponding first ends of said pole pieces, forming pole faces, and normally attracted against said pole faces by the flux of said permanent magnet when said electromagnetic means is deenergized; spring means biasing said armature to disengage said pole faces; and means forming a magnetizable flux path adjacent said permanent magnet and opposing the flux path including said permanent magnet and said armature; said magnetizable flux path forming means, said pole pieces and said armature forming a closed magnetic circuit for the flux of said electromagnetic means, said closed magnetic circuit by-passing said permanent magnet.

4,020,434

POLARIZED ELECTROMAGNETIC RELAY AND METHOD OF MANUFACTURING THE SAME

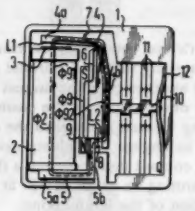
Bruno Jaegle, Munich, and Gerhard Furtwaengler, Unterhaching, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 23, 1976, Ser. No. 651,912

Claims priority, application Germany, Jan. 27, 1975, 2503159

Int. Cl.² H01H 51/22

U.S. Cl. 335—230 **14 Claims**



1. In a polarized relay of the type having an operating winding on a core, a two-legged pivotal armature whose first leg forms a first working air gap with one pole of the operating winding and whose second leg forms a second working air gap with an angular yoke, and a permanent magnet arranged parallel to the operating winding and whose magnetic flux is closed partially through the first armature leg and the first working air gap and partially through the second armature leg and the second working air gap, the improvement comprising:

a yoke plate pivotally supporting said armature, the angular yoke including a portion aligned with and separated from said yoke plate, said yoke plate and said portion of the angular yoke extending parallel to the operating winding, said yoke plate and said portion of the angular yoke each including a flat surface parallel to the operating winding, the permanent magnet mounted on said flat surfaces.

4,020,435

HINGED ARMATURE RELAY

Holger Nicolaisen; Finn Schnoor Andersen, both of Nordborg, and Jens Peter Jensen, Augustenborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

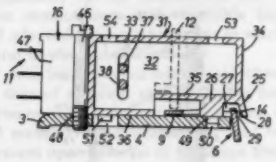
Filed Oct. 9, 1975, Ser. No. 620,871

Claims priority, application Germany, Oct. 28, 1974, 2451188

Int. Cl.² H01F 7/14

U.S. Cl. 335—275 **1 Claim**

1. An electromagnetic contact switch relay assembly comprising a magnetic coil, a yoke attached to said coil having a flat plate portion with a knife edge at one end thereof, an insulated contact carrier attached to said plate portion, a generally L-shaped armature having first and first and second legs with the corner therebetween having the inside thereof engaging said knife edge, said first leg of said armature having an inoperative position on said plate while at rest and an operative position while forming an acute angle with respect to said plate, said carrier having an end wall with resilient bifurcated portions engaging the outside of said armature corner and a rigid stop member therebetween for limiting the



movement of said armature, a slide member for actuating contact switches slidably mounted in said carrier in juxtaposition to said first armature leg for actuation in response to movement by said first armature leg, said carrier having a central wall with a central recess formed therein immediately above said corner of said armature, said second leg of said armature having a lug extending beyond said corner and into said recess for retaining said armature in its installed position.

4,020,436

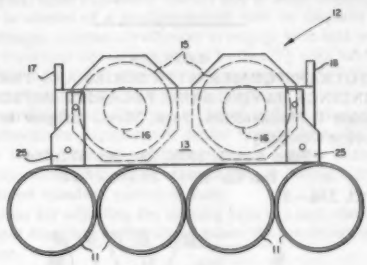
LIFTING MAGNET FOR LAYERED PIPE

Donald C. McDonald, Sherborn, Mass., assignor to O. S. Walker Company, Inc., Worcester, Mass.

Filed Apr. 11, 1975, Ser. No. 567,242

Int. Cl.² H01F 7/20

U.S. Cl. 335—286 **1 Claim**



1. A lifting magnet for layered pipe, said magnet comprising:

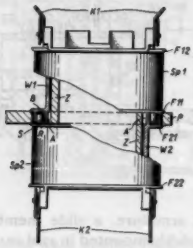
a pair of elongate, flat pole pieces, said pole pieces being essentially parallel to each other and to a vertical plane and having flat bottom edge surfaces adapted to lie across a layer of stacked pipe, with the pole pieces oriented horizontally transversely to the length of the pipe so that the effective area of each magnetic contact is thus determined by the curvature of the surface of the pipe and the thickness of the pole piece;

between said pole pieces, at least one coil for generating a magnetomotive potential between the pole pieces, said pole pieces being of essentially uniform thickness over most of their length but having substantially thicker portions adjacent each end providing, to a pipe contacting the ends of the pole pieces, an effective contact area of cross-sectional area substantially equal to the cross-sectional area of the effective contact area presented to a pipe contacting the pole pieces intermediate their ends so that the magnet can exert a substantially equal lifting force on all pipes it contacts.

4,020,437
RELAY HAVING TWO WINDING SUPPORTS

Josef Kern, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 27, 1975, Ser. No. 544,514
Claims priority, application Germany, Jan. 25, 1974, 2403622
Int. Cl.² H01F 5/00
U.S. Cl. 335—299 **3 Claims**



1. In a relay having at least a pair of axially aligned winding supports constituting coil forms, said winding supports comprising:

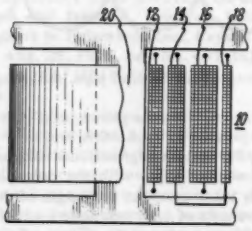
flange members on at least the adjacent ends of said coil forms, each said flange member having pins and recesses thereon, the said recesses on a given flange member having a configuration and being located as to receive and engage the said pins on an opposing said flange member on an adjacent coil form and

a mounting plate interposed between said adjacent coil forms and having an opening defined therein, said opening being located so that the said engaged pins and recesses extend therethrough, said engaged pins and recesses being substantially entirely within said openings.

4,020,438
AUTOTRANSFORMER WITH SERIES AND TERTIARY WINDINGS HAVING SAME POLARITY IMPEDANCE

Abraham I. Manimalethu, Peru, Mass., assignor to General Electric Company

Filed Apr. 1, 1976, Ser. No. 672,544
Int. Cl.² H01F 33/00, 27/28
U.S. Cl. 336—5 **5 Claims**



1. In an autotransformer of the type including,

a magnetizable core having at least one leg, inductively coupled tertiary, common and series, layer-wound windings,

of generally cylindrical shape, radially superposed on a leg of said core,

wherein the improvement comprises:

said tertiary winding being the innermost winding; and

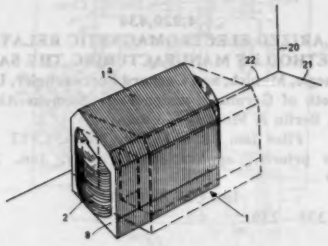
said series winding being located between portions of said common winding,

the innermost portion of said common winding containing from 75 to 85 percent of the total turns of said common winding.

4,020,439
INDUCTIVE STABILIZING BALLAST FOR A GAS AND/OR VAPOR DISCHARGE LAMP

Alexander Joseph Gerardus Thiessens, and Leonard Woldring, both of Emmasingel, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 542,838, Jan. 21, 1975, Pat. No. 3,947,955. This application Nov. 13, 1975, Ser. No. 631,737
Claims priority, application Netherlands, Feb. 9, 1974, 7401806
Int. Cl.² H01F 27/08, 27/26
U.S. Cl. 336—61 **10 Claims**

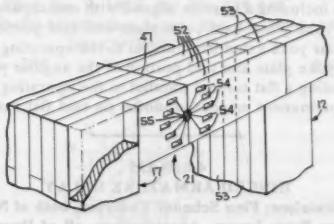


1. An inductive device comprising an electric coil, at least one pack of substantially identical parallel arranged laminations engaging one another over the largest part of their surface, the inductive device being of the casing type, said pack of laminations being located parallel to the center line of the electric coil so as to engage and clamp said coil to provide substantial surface contact therebetween a flat part of each of said laminations forming an angle of 85° at a maximum with the stacking direction of the laminations.

4,020,440
CONVERSION AND CONTROL OF ELECTRICAL ENERGY BY ELECTROMAGNETIC INDUCTION

Nathan A. Moerman, 7310 Maple Ave., Chevy Chase, Md. 20015

Filed Nov. 25, 1975, Ser. No. 635,007
Int. Cl.² H01F 21/08
U.S. Cl. 336—155 **5 Claims**



1. In an electromagnetic induction control means,

laminated magnetic means having magnetic properties compatible with the magnetic properties of the structure in which the control is utilized,

a plurality of aperture means in said laminated magnetic means disposed to form a segmented toroid,

one of said aperture means located along the central axis of sid toroid,

an electrical conducting means disposed through said cen-

tral aperture and each of said plurality of apertures and around the outside of said magnetic means in diametrically opposed positions,

said conducting means providing a magnetic field of toroidal configuration having minimum field strength at the outside surfaces of said magnetic means,

whereby a radial saturation gradient about said central aperture means and domain rotation is produced in a toroidal configuration with said induction control means.

4,020,441
ELECTRIC FUSE HAVING UNDULATED FUSIBLE ELEMENT

Philip C. Jacobs, Jr., Newtonville, Mass., assignor to Gould Inc. Electric Fuse Division, Mass.

Filed Mar. 5, 1976, Ser. No. 664,104
Int. Cl.² H01H 85/08
U.S. Cl. 337—187 **5 Claims**

1. An electric fuse including

a. a tubular casing of electric insulating material;

b. a pair of terminal elements arranged at the ends of and closing said casing;

c. a granular arc-quenching filler inside of said casing;

d. an undulated fusible element inside said casing, conductively interconnecting said pair of terminal elements and embedded in said filler, said fusible element having a plurality of spaced aligned perforations, and

e. a straight rod of an electric insulating material extending through said plurality of aligned perforations.

4,020,442
COMPOSITE-TYPE HEAT-SYSTEM FIRE SENSING DEVICE

Hiroshi Ito; Tadashi Sugiyama; Yoshinori Kaminaka; Yuichiro Yamamoto; Takeshi Tanigawa; Shunichi Shoji, and Yoshifusa Saito, all of Tokyo, Japan, assignors to Hochiki Corporation, Tokyo, Japan

Filed Mar. 4, 1975, Ser. No. 555,210
Claims priority, application Japan, Mar. 8, 1974, 49-27613; Mar. 12, 1974, 49-28393; Mar. 27, 1974, 49-35571; May 17, 1974, 49-55454; May 22, 1974, 49-58364
Int. Cl.² 337 396; H01H 37/02
U.S. Cl. 337—299 **8 Claims**

1. A composite heat-system fire sensing device including differential and constant temperature sensing elements comprising in combination:

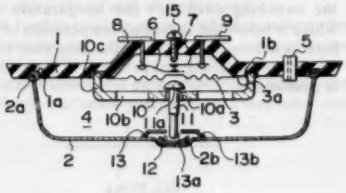
an open-mouthed generally bowl-shaped heat-receiving member having a bottom wall;

a diaphragm positioned across the open mouth of said heat-receiving member and forming a heat-receiving chamber therewith, venting means being provided for venting said chamber to the atmosphere;

a reversible bimetallic element positioned within said chamber adjacent the bottom wall thereof and adapted to reverse shape at a predetermined temperature from a normally concave configuration to a convex configuration;

a pair of electrical contact members mounted in predetermined adjustably spaced relation on one side of said diaphragm remote from said reversible bimetallic element and adapted to be connected to an electrical circuit of an alarm device;

a push rod member mounted within said chamber having one end thereof adjacent said reversible bimetallic element in the normally concave configuration thereof, said push rod member being shiftable by said reversible bimetal element upon reversal of the shape thereof so as to



engage with one side of said diaphragm to displace said diaphragm a distance sufficient to engage with one of said electrical contact members to thereby urge said one electrical contact member into engagement with the other of said electrical contact members;

a gaseous medium being provided within said chamber adapted, upon expansion thereof due to a rise in temperature in excess of a predetermined rate, to displace said diaphragm a distance sufficient to engage with said one of said electrical contact members to thereby urge said one electrical contact member into engagement with the other of said electrical contact members;

said reversible bimetallic element being so dimensioned that the maximum displacement distant thereof from the concave to the convex configurations is greater than the displacement distance of said diaphragm during a predetermined standard period of time;

and means for adjusting the spacing between said electrical contact members to thereby regulate the sensitivity of the device.

4,020,443
VARIABLE TEMPERATURE SENSOR

Rodney L. LeRoy, Pointe Claire; David H. Grossman, Mount Royal; R. Douglas McDonald, Baie d'Urfee, and David F. Hemmings, Montreal, all of Canada, assignors to Canada Wire and Cable Limited, Toronto, Canada

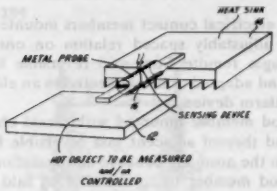
Filed June 3, 1975, Ser. No. 583,254
Claims priority, application Canada, Apr. 18, 1975, 224930
Int. Cl.² H01C 7/04
U.S. Cl. 338—28 **5 Claims**

1. A variable temperature sensor for detecting the temperature of an object comprising:

a. a thermally conductive metal probe having one end thereof adapted to contact an object the temperature of which is to be sensed, and its other end adapted to contact a heat sink so as to create a substantially linear temperature profile between the two ends of the thermally conductive probe; and

b. a fixed temperature switching device having a predetermined switching temperature attached to said thermally

conductive probe at a point along the length of said probe which is substantially at the switching temperature of the switching device when a desired predetermined substantially linear temperature profile is present; whereby, depending on the switching temperature of said fixed temperature switching device, detection of either the temperature of an object which is above the switching tempera-



ture of the temperature switching device when the heat sink temperature is below the switching temperature of the switching device or the temperature of an object which is below the switching temperature of the temperature switching device when the heat sink temperature is above the switching temperature of the switching device is permitted.

4,020,444

SLIDER ARRANGEMENT FOR POTENTIOMETERS OR THE LIKE

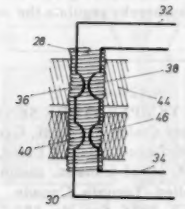
Kurt Oelsch, and Klaus Schulz, both of Berlin, Germany, assignors to Fernsteuergerate, Kurt Oelsch KG, Berlin-Britz, Germany

Filed Feb. 6, 1976, Ser. No. 655,730

Claims priority, application Germany, Feb. 27, 1975, 2508530

Int. Cl.² H01C 1/12

U.S. Cl. 338—202 **9 Claims**



1. In a slider arrangement comprising: electrically conducting means, slider means in the form of a wire helix having an inner side, guiding means for moving said slider means along said electrically conducting means, and contact pressure generating means for urging said slider means into engagement with said electrically conducting means under a contact pressure, the improvement wherein said guiding means comprises a strap, which loosely extends into said wire helix, said contact pressure generating means urging said strap into tight engagement with said inner side of the wire helix under said contact pressure, which is transmitted to said wire helix through said strap.

4,020,445

VARIABLE RESISTANCE CONTROL

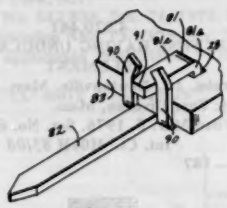
William L. Kelver, Cassopolis, Mich.; Ronald L. Stuckey, Monroe, and Arthur L. Rozema, Elkhart, both of Ind., assignors to CTS Corporation, Elkhart, Ind.

Division of Ser. No. 530,749, Dec. 9, 1974, Pat. No. 3,953,821.

This application Apr. 26, 1976, Ser. No. 679,924

Int. Cl.² H01C 1/012

U.S. Cl. 338—312 **5 Claims**



1. In a resistor, the combination of a ceramic substrate provided with an opening, a resistance element carried by the substrate, a conductive pad carried by said substrate and connected to the resistance element, a terminal secured to said substrate, the terminal comprising a head and a tail, the head being received in and extending through the opening, and a projection integral with the terminal and engaging the head extending through the opening and further securing the terminal to the substrate, one of said head and projection engaging the conductive pad.

4,020,446

ULTRASONIC WAVE TRANSMITTING SYSTEM

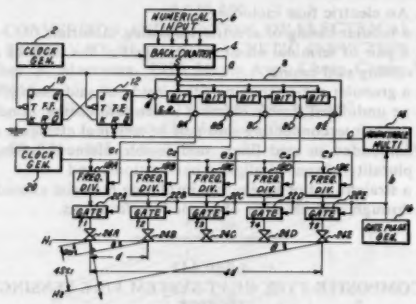
Masajiro Iida; Hideharu Morimatsu, both of Takarazuka; Itsuo Fukuoka, and Yoshinari Yoshida, both of Nishinomiya, all of Japan, assignors to Furno Electric Company, Limited, Japan

Filed Sept. 16, 1975, Ser. No. 613,963

Claims priority, application Japan, Aug. 13, 1975, 50-6684

Int. Cl.² G01S 9/66

U.S. Cl. 340—5 R **1 Claim**



1. An ultrasonic wave transmitting system, comprising a plurality of ultrasonic transducers having a common resonance frequency and being arranged side by side in a row at fixed intervals, a first clock pulse generator for generating a first train of clock pulses having a higher harmonic relationship with said common frequency, a plurality of frequency dividers having reset inputs respectively, the inputs of said frequency dividers being supplied from said first clock pulse generator and the outputs thereof being connected to said ultrasonic transducers respectively, a second clock pulse generator having frequency control means for generating a second train of clock pulses, and resetting means connected to said second clock pulse generator for resetting said frequency dividers sequentially at a time interval equal to the period of

said second train of clock pulses, said resetting means comprising a device for generating a reset signal consisting of a sole pulse, and a shift register having a normal input connected to the output of said reset signal generating device, a shift input connected to the output of said second clock pulse generator and parallel outputs connected respectively to said reset inputs of said frequency dividers.

4,020,447

METHOD AND APPARATUS FOR RECORDING SEISMIC SIGNALS

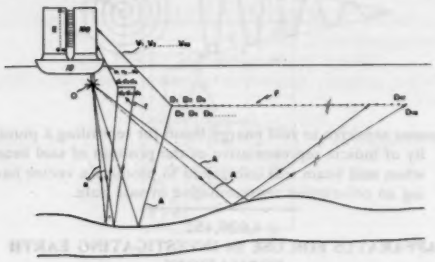
Dominique Michon, Paris, and Philippe Staron, Ris-Orangis, both of France, assignors to Compagnie Generale de Geophysique, Massy, France

Filed Apr. 28, 1975, Ser. No. 572,088

Claims priority, application France, Apr. 30, 1974, 74.15015

Int. Cl.² G01V *1/24*

U.S. Cl. 340—7 R **7 Claims**



1. A method of marine seismic prospecting comprising the steps of:

emitting a shock wave from at least one marine seismic source means;

detecting said shock wave with a linear long spacing array comprising N detector means and with a linear short spacing array comprising a lower number *n* of detector means, said long spacing array extending farther from said source means than said short spacing array;

producing at each detector means a signal representing said detected shock wave; and

successively recording in a single recording channel first a signal coming from one of said *n* detector means of the short spacing array and then a signal from one of said N detector means of the long spacing array, wherein each of said N signals from said long spacing detector array is recorded in a separate recording channel and whereby the N+*n* signals are recorded on less than N+*n* recording channels.

4,020,448

OSCILLATING CRYSTAL TRANSDUCER SYSTEMS

James Patrick Corbett, The Old Manor House, 21, Station Road, Thames Ditton, England

Filed Aug. 22, 1974, Ser. No. 499,489

Claims priority, application United Kingdom, Sept. 17, 1973, 43516/73

Int. Cl.² H04B *13/00*

U.S. Cl. 340—8 S **6 Claims**

1. A force transducer comprising:

a chamber;

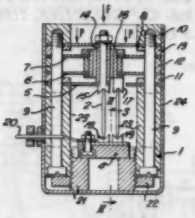
a base member within said chamber;

two matched plate-like piezoelectric crystals dispoed within said chamber upright with respect to said base member;

a mounting assembly for said crystals, said mounting assembly consisting of two similar pairs of seats, each pair having a first seat which is supported on said base member and engages an edge portion of a respective one of said crystals and a second seat which engages the diametrically opposite edge portion of the respective crystal;

electrical means for exciting each of said crystals into oscillations;

a spigot extending within said chamber for transmitting a force to be measured to one of said crystals via said second seat of the pair of seats which supports said one crystal;



two spaced apart resilient supports which extend from said spigot to the walls of said chamber; and

at least one further resilient support which is independent of the first-mentioned two spaced apart resilient supports, said further resilient support extending into said chamber from a wall thereof and being connected to said second seat of the pair of seats which supports said other crystal.

4,020,449

SIGNAL TRANSMITTING AND RECEIVING DEVICE

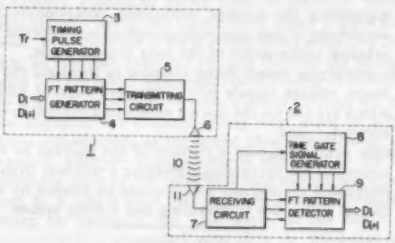
Tetsuo Ito, Hitachi, and Motohisa Nishihara, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed May 19, 1975, Ser. No. 578,767

Claims priority, application Japan, May 22, 1974, 49-56484; June 5, 1974, 49-62884

Int. Cl.² H04B *11/00*

U.S. Cl. 340—15 **5 Claims**



1. An imformation transmitting and receiving device comprising, in combination:

a transmitter unit for encoding and transmitting a piece of data to be transmitted as a frequency signal-time pattern, said pattern being comprised of

a plurality *n*−1 of frequency signals, different from each other and each of which has a duration corresponding to a prescribed time interval *t*, and

an additional time interval *t* occupied by no frequency signal,

so that said frequency signal-time pattern occupies *n* sequential time intervals, *n*−1 of which contain signals of respectively different frequencies, and

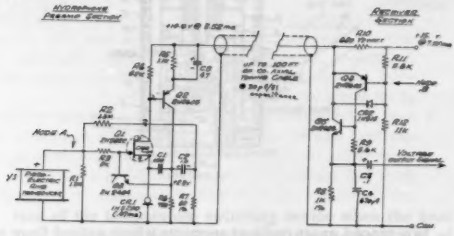
wherein the leading interval of time is occupied by one of said plurality *n*−1 of frequency signals; and

a receiver unit for receiving the piece of data encoded and transmitted by said transmitter unit, for detecting the frequency signal-time pattern, and for decoding the order of the frequency signals as contained within said pattern.

4,020,450
TOWED HYDROPHONE PREAMPLIFIER AND RECEIVER

Serge Kostrukoff, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 5, 1976, Ser. No. 646,810
Int. Cl.² G01V *1/18, 1/38*
U.S. Cl. 340—15.5 GC **1 Claim**



1. A circuit for transmitting signals generated by a transducer that are representative of acoustic energy comprising:

means for amplifying the transducer signals and converting them to current modulations, the amplifying means including a direct coupled two stage alternating current amplifier with negative voltage feedback to stabilize the alternating current and a low frequency rolloff network to attenuate spurious inputs;

the two stage alternating current amplifier having a constant current biased field effect transistor which has a voltage clipping element coupled across the gate-source junction to effect negative polarity clipping;

means connected to the amplifying means for supplying power to, conducting the current modulated signal from, and towing the amplifying means and transducer, the towing means including a two conductor coaxial cable having a long length approaching 100 feet;

means coupled to the amplifying and towing means for converting the current modulated components of the amplifying means into voltage signals not affected by the reactive components of the long coaxial cable,

the amplifying means being coupled to translate the transducer voltage signals into responsive current variations which are fed via the towing means to a current to voltage converter; and

means coupled across a portion of the current to voltage converter for preventing damaging potentials from being impressed thereacross which could be caused by a short circuit within the transmitting and towing means.

4,020,451
METHODS AND APPARATUS FOR RECORDING WELL LOGGING MEASUREMENTS

Jennings W. Elliott, Friendswood, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 378,754, July 12, 1973, Pat. No. 3,916,372. This application Mar. 6, 1975, Ser. No. 556,059
Int. Cl.² G01V *1/40*
U.S. Cl. 340—15.5 DS **16 Claims**

1. Apparatus for recording data as a vector comprising:

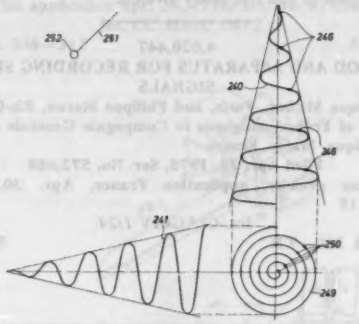
means for generating a first sinusoidal signal having an increasing amplitude;

means for generating a second sinusoidal signal having an increasing amplitude, said second sinusoidal signal having the same frequency as said first signal and being phase shifted 90° from said first signal;

means responsive to said first and second sinusoidal signals adapted for sweeping an energy beam in an increasing spiral pattern;

means for providing data representative of information to be recorded;

means responsive to said data for unblanking said sweeping energy beam during the same angular portion of each cycle of one of said sinusoidal signals; and

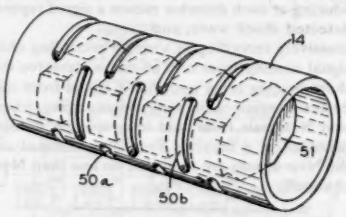


means sensitive to said energy beam for recording a plurality of indicia representative of the position of said beam when said beam was unblanked to produce a vector having an orientation representative of said data.

4,020,452
APPARATUS FOR USE IN INVESTIGATING EARTH FORMATIONS

Jean-Claude Trouiller, Chaville, and Bernard Vivet, Buc, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 256,074, May 23, 1972, abandoned. This application Feb. 18, 1975, Ser. No. 550,787
Claims priority, application France, May 24, 1971, 71.18637
Int. Cl.² G01V *1/40*
U.S. Cl. 340—17 R **18 Claims**



1. In apparatus used for investigating earth formations traversed by a borehole, a structure for attenuating and delaying acoustic energy traveling in the structure, comprising:

a substantially rigid longitudinally extending member having interruptions in the longitudinal continuity of the wall of said member over a given section thereof to provide only tortuous paths for the passage of acoustic energy traveling in said structure and through said section of said member; and

a plurality of substantially rigid masses periodically spaced along the interior of said section, each such mass being mechanically integral with opposite sides of the interior of said member at locations relative to said interruptions for effectively (1) enabling said interruptions and masses to cooperate as a mechanical low pass filter over said section to attenuate and delay most acoustic energy attempting to pass through said member and (2) contributing to the mechanical strength of said section.

4,020,453

SENSING SYSTEM FOR ACTUATING A SAFETY DEVICE

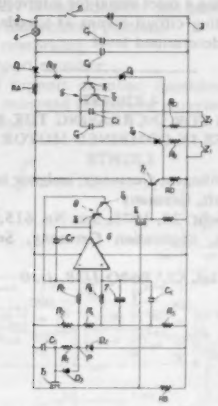
Johann Spies, Pfaffenhofen, Jlm, and Alfons Wöhrl, Schrobenhausen, both of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Nov. 13, 1975, Ser. No. 631,674

Claims priority, application Germany, Nov. 16, 1974, 2454424

Int. Cl.² B60R 21/00; H01H 35/14

U.S. Cl. 340—52 H 8 Claims



1. A sensing circuit for actuating a vehicle safety device, comprising two terminals connectable to a voltage source, an acceleration sensor having two connections, evaluating means coupled to the acceleration sensor for responding to the acceleration sensor, and an output stage coupled to the evaluating means for operating the safety device in response to the evaluating means.

said evaluating means including a differential amplifier having a first input and a second input and an output, a voltage divider having a center point and two end points, constant potential producing means coupled to one of said terminals and having a reference point for producing a reference potential at the point relative to the one of said terminals, an integrating resistor, an integrating capacitor, a threshold value switch having a control electrode, and isolating means for controllably isolating said threshold value switch from said output stage;

one connection of said acceleration sensor being connected to one input of the differential amplifier, the other connection of said acceleration sensor being connected with the center point of the voltage divider, one end point of said voltage divider being coupled to the reference point and the other to the one of said terminals, said integrating resistor connecting the second input of said differential amplifier to the reference point, said integrating capacitor being connected from the output of said differential amplifier to the second input; said second input being connected with the control electrode of said threshold value switch, said threshold value switch having a path main current flow connected in series with the output of said differential amplifier.

said isolating means being connected between said threshold value switch and said output stage and being responsive to the voltage across said terminals for isolating said threshold value switch from said output stage until the voltage across said terminals reaches a predetermined value. --

4,020,454

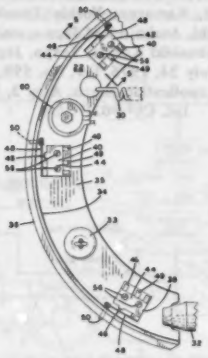
BRAKE MONITORING SYSTEM

Arley L. Malonee, 540 Fresno St., Coalinga, Calif. 93210

Filed Feb. 17, 1976, Ser. No. 658,286

Int. Cl.² B60T 17/22

U.S. Cl. 340—52 B 1 Claim



1. A brake monitoring system particularly suited for use in monitoring brake shoe adjustment, brake lining wear and brake temperature for the brake shoes of an expansible brake shoe subassembly circumscribed by a metallic wear plate of an annular brake drum subassembly for one wheel of a wheeled vehicle comprising:

A. at least two groups of normally open electrical switches, each group consisting of a pair of brake adjustment switches and a wear detection switch, each switch of each group being characterized by a resiliently supported shorting bar and an axially movable stem formed of Mylar and connected with the switch for displacing the shorting bar in a circuit closing direction;

B. means for separately mounting the switches of each group in angular spaced relation on a given brake shoe of a radially expansible brake shoe subassembly having a non-metallic lining, the thickness of which is reducible by wear, with the stem of each switch being projected axially into an aperture extended radially through the lining, the stem of each brake adjustment switch being characterized by a length such that the stem extends through the lining for engaging the circumscribing wear plate of a brake drum subassembly as the brake shoe subassembly is expanded, whereby axial motion is imparted to the stem, while the stem of the wear detection switch is characterized by a length such that the stem extends through the lining for engaging the wear plate, as the brake shoe subassembly is expanded, only after the thickness of the lining has been reduced by wear, whereby axial motion is imparted to the stem, subsequent to a reduction in the thickness of the lining;

C. a pair of circuits, each of which includes a pair of pin-receiving sleeves supported in a fixed relationship adjacent to the brake shoe subassembly and singly connected to one brake adjustment switch, and a testing circuit having an alarm signal generator connected with a pair of terminal pins adapted to be received by said pin-receiving sleeves;

D. an alarm circuit connected with the wear detection switch of each group including a remotely related alarm signal generator for generating an alarm signal in response to axial motion imparted to the stem of the wear detection switch; and

E. a pair of temperature responsive switches, each being separately mounted on one brake shoe of said pair of brake shoes and connected in a circuit including an alarm signal generator for completing the electrical circuit in response to changes of determinable magnitude in the

temperature of the brake shoe on which the switch is mounted.

4,020,455

DECELERATION DETECTOR SYSTEM FOR MOTOR VEHICLES WITH AUTOMATIC TRANSMISSION

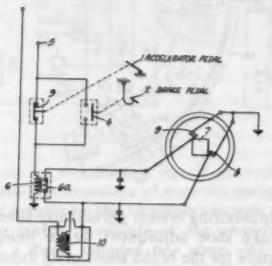
Shoichiro Irimajiri, Kawagoe; Yoshio Tanaka, Tokyo, and Atsushi Kobayashi, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 24, 1975, Ser. No. 598,863

Claims priority, application Japan, Aug. 2, 1974, 49-87990

Int. Cl.² F02P *5/04*

U.S. Cl. 340—53 **3 Claims**



1. A spark ingition timing control apparatus for retarding ignition timing in response to detection of deceleration of an engine-powered vehicle having an automatic transmission and having an accelerator pedal and a brake pedal, said control apparatus comprising, in combination: a first electric switch for detecting release of pressure from the accelerator pedal, a second electric switch for detecting application of pressure to the brake pedal, a detector device connected to said switches and including a relay actuated by at least one of the two switches, an ignition coil, an ignition timing device including an advance contact point and a retard contact point, said contact points being connected in parallel with said ignition coil, said relay being placed in the circuit including said retard contact point, whereby the ignition timing may be changed from advance to retard on deceleration of the vehicle.

4,020,456

TIRE AIR PRESSURE SYSTEM FOR AUTOMOTIVE VEHICLES

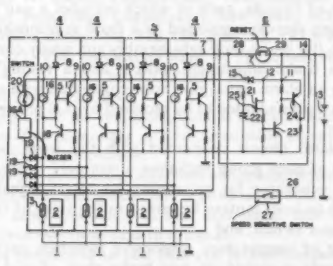
Akio Nozi, 2-7-13, Motoasakusa, Taito, Tokyo, Japan

Continuation of Ser. No. 447,045, Feb. 28, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,597

Claims priority, application Japan, July 4, 1973, 48-74866

Int. Cl.² B60C *23/04*

U.S. Cl. 340—58 **5 Claims**



1. An air-pressure alarm system for automotive vehicles having a number of wheels with pneumatic tires thereon; the system comprising pressure detector means secured to a portion of one of the vehicle wheels fo detecting the reduction in air pressure in the tire of that wheel below a specified level, an alarm signaling circuit, including magnetically operable switch means secured to stationary components of the vehicle in a position opposite to said detector means, to sense the condition of the latter; an alarm device operable when said switch means is closed, thereby signaling to the driver the air-pressure reduction in said wheel below the specified level; alarm holding circuit means activatable in response to the operation of said switch means to continuously energize said alarm device and to keep the same in the energized state; and a circuit for producing a reset signal for intermittently releasing the activated holding circuit means at speeds of the vehicle that exceed a predetermined level.

4,020,457

INSTALLATION FOR INCREASING THE BRIGHTNESS DIFFERENCES IN COMBINED MOTOR VEHICLE LIGHTS

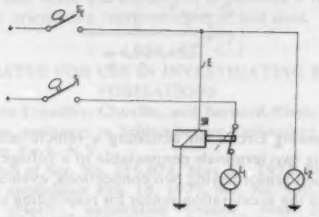
Klaus Neuffer, Boblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Sept. 22, 1975, Ser. No. 615,679

Claims priority, application Germany, Sept. 27, 1974, 2446171

Int. Cl.² B60Q *1/38*, *1/30*

U.S. Cl. 340—66 **8 Claims**



1. An installation for controlling lights to render the lights more distinctly visible comprising a pair of light means each including first and second lights, a source of energizing voltage, first means for selectively connecting the first light of each of said pair of light means to said source of energizing voltage, a source of periodic voltage pulses, second means for selectively connecting one of said second lights of said pair of light means to said source of periodic voltage, and control means responsive to connection of one of said second lights to said source of periodic voltage for disconnecting only the first light of the same light means from said source of energizing voltage independently of said first means.

4,020,458

LIGHT SIGNALLING DEVICE FOR BICYCLES AND SWITCH THEREFOR

Anthony Jude Windisch, 3882 Walsh St., St. Louis, Mo. 63116

Filed Feb. 27, 1976, Ser. No. 661,952

Int. Cl.² H01H *3/16*, *9/26*; B60Q *1/00*

U.S. Cl. 340—67 **6 Claims**

1. A light signalling device for bicycles comprising, in combination:

a. a housing;

b. a cover mounted on the housing;

c. at least two like-colored light penetrable portions in the cover;

d. at least one light penetrable portion different in color from the like-colored portions; (and)

e. light emitting lamp means mounted in the housing for separately illuminating each light penetrable portion (.) ;

f. the one light penetrable portion, different in color from

the two like-colored portions, separates the two like-colored portions;

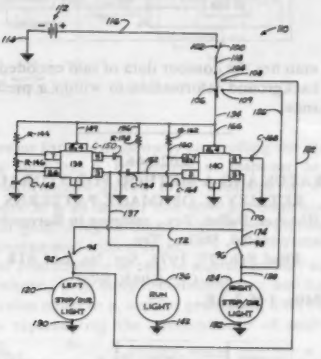
g. multi-positionable switch means connected for controlling illumination of the light penetrable portions in various arrays and positionable for:

1. simultaneously interrupting illumination for each portion;
2. intermittently illuminating only the one portion;
3. simultaneously illuminating only the two like-colored portions;
4. alternately illuminating the one portion and one of the two like-colored portions; and
5. alternately illuminating the one portion and another of the two like-colored portions.

3. A switch comprising:

a. a first support member;

b. a second support member; (position selection means resiliently mounted for pivotal movement on the support member; and)



c. means for interconnecting and maintaining the first and second support members in relatively parallel spaced relationship; (position selection guide means on and in spaced relationship with the support member for guiding a portion of the position selection means.)

d. a switch lever pivotal at the first support member including first and second ends, the lever extending through the first support member and terminating at the second end in abutting relationship with the second support member;

e. a handle portion on the first end of the switch lever terminating in spaced relationship with the first support member;

f. a striker member on the second end of the switch lever;

g. a beaded member superimposed on and protruding beyond the striker member at the second end of the switch lever;

h. a first resilient member on the switch lever compressed between the handle and the first support member; and

i. a second resilient member on the switch lever compressed between the striker and the first support member.

4,020,459

PARITY GENERATION AND BUS MATCHING ARRANGEMENT FOR SYNCHRONIZED DUPLICATED DATA PROCESSING UNITS

Stephen Dexter Coomer, Westerville, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 28, 1975, Ser. No. 626,338

Int. Cl.² G06F *11/10*

U.S. Cl. 340—146.1 AG **7 Claims**

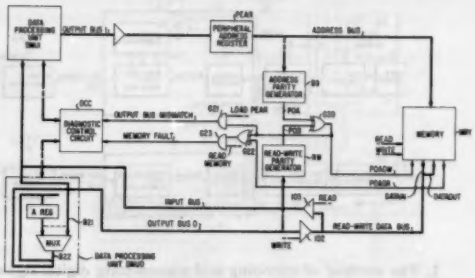
1. A diagnostic arrangement for use with a pair of duplicated processing units operating in synchronism, each of said units including an output bus connected to a memory, one of said output buses connectd to said memory via an address register, said arrangement comprising

a first parity network providing a first parity indication over the contents of said address register,

a second parity network providing a second parity indication over information on the other of said output buses,

means for combining said first and second parity indications to generate a combined parity indication,

means responsive to said combining means and to the loading by one of said processing units via said one output bus of said address register with an address identifying a



storage location in said memory for providing a bus mismatch signal if said first and second parity indications do not match, and

means responsive to the loading by said processing units of said output buses with data to be written in said memory and to said combining means for storing in said memory both said combined parity indication and said data, whereby said combined parity indication now indicates parity over said data and over the address in said address register.

4,020,460

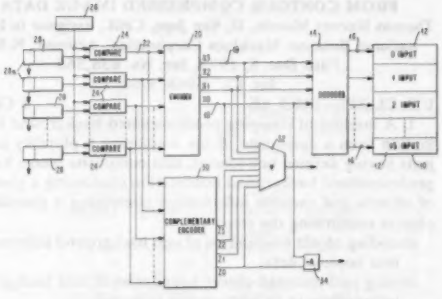
METHOD AND APPARATUS OF CHECKING TO DETERMINE IF A SIGNAL IS PRESENT ON MORE THAN ONE OF N LINES

Julius Dwight Jones, Wappingers Falls, and Dale Milton Junod, Highland, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Nov. 13, 1975, Ser. No. 631,767

Int. Cl.² G06F *11/00*; H03K *13/32*

U.S. Cl. 340—146.1 AB **4 Claims**



1. A method for determining whether more than one of n lines are up comprising the steps of:

encoding the n lines into m digits where $n = 2^m$ in two complementary sets, $X_0, X_1, \ldots X_m$ and $Z_0, Z_1, \ldots Z_m$,

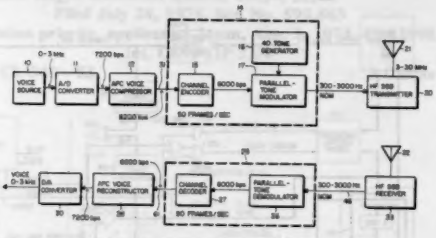
comparing the two sets together in accordance with the following formula: $(X_0 \; Z_0) \cdot (X_1 \; Z_1) \ldots \cdot (X_m \; Z_m)$; and,

determining if the resultant of comparison is a binary one or a binary zero to indicate whether more than one line is up.

4,020,461
METHOD OF AND APPARATUS FOR TRANSMITTING AND RECEIVING CODED DIGITAL SIGNALS

William B. Adams, Camillus, N.Y.; Douglas R. Anderson, Van Nuys, and Daniel D. Carpenter, Manhattan Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Nov. 18, 1975, Ser. No. 633,148
Int. Cl.² G06F 11/12
U.S. Cl. 340—146.1 AL 15 Claims



1. The method of encoding and transmitting digital signals representing information, the digital signals including at least three groups of most important, next most important and least important bits, the method comprising the steps of:

a. encoding the most important bits represented by electrical signals into an 8-ary Reed Solomon code (7,k) where k is the dimension of the code and is substantially less than 7;

b. encoding the next most important bits represented by electrical signals into an 8-ary Reed Solomon code (7,k+1);

c. encoding the least important bits represented by electrical signals into octal form;

d. generating a plurality of subcarriers corresponding to the number of code words and octal information to be transmitted;

e. differentially phase modulating each of the subcarriers with the respective code words and octal information so that the differential phases of each subcarrier are capable of assuming 8 different values; and

f. transmitting the modulated subcarriers or a carrier;

4,020,462
METHOD AND APPARATUS FOR FORM REMOVAL FROM CONTOUR COMPRESSED IMAGE DATA

Thomas Harvey Morrin, II, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,566
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 AE 6 Claims

1. A method of stripping predetermined background information from a composite image containing a plurality of objects having defined boundaries, said composite image having predetermined background information containing a plurality of objects and variable information containing a plurality of objects comprising the steps of:

encoding object boundaries of said background information into contour data;

storing said encoded object boundaries of said background information in an addressable memory;

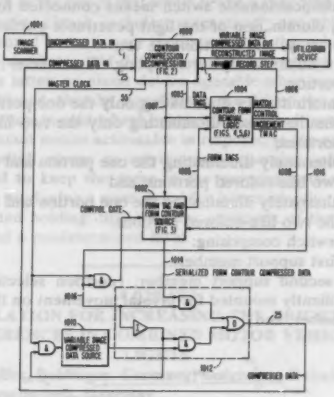
scanning said composite image in such a way as to encounter objects in a fixed order;

encoding object boundaries of said composite image into contour data;

addressing said addressable memory so as to read out said encoded background contour data in the same fixed order as said scanned composite image objects are encountered;

comparing said composite image contour data with said background information contour data; and

inhibiting the transfer to a utilization device of those encoded objects of said composite image whose contour

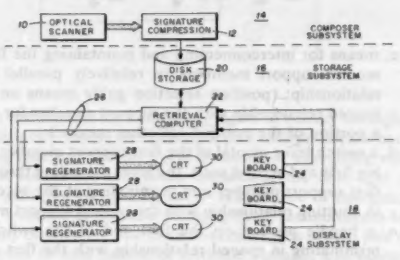


data matches the contour data of said encoded objects of said background information to within a predetermined tolerance.

4,020,463
APPARATUS AND A METHOD FOR STORAGE AND RETRIEVAL OF IMAGE PATTERNS

David P. Himmel, Dallas, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Feb. 27, 1976, Ser. No. 661,814
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 AE 11 Claims



1. Apparatus for compressing a pattern of digitized input data having a multiple bit width for removal of excess information and converting into a vector pattern, comprising in combination:

an image matrix for storing each value of digitized input data produced by pattern scanning.

a process array within said image matrix through which the digitized input data in the image matrix is shifted,

means for scanning each bit of the input data in the image matrix and generating a boundary signal at a transition between a data bit of a first value and a data bit of a second value,

means for tracing a boundary outlined by the stored input data during a tracing sequence in response to the boundary signal in a single bit sequence,

means for changing the value of excess information bits during the tracing sequence from the first value to the second value,

means responsive to each information bit of the first value after completion of the tracing sequence to generate an encoded representation of vectors having a direction based on surrounding data bits of the first and second values, and

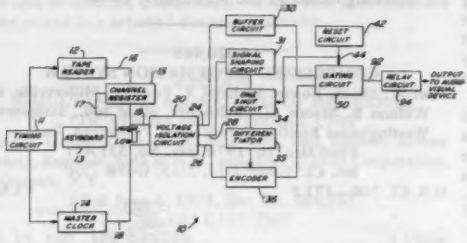
means for storing the encoded representations of the vectors in recoverable memory.

4,020,464

PROGRAMMER EXPANDER FOR A PLURALITY OF DEVICES

William R. Wells, Linewood, N.J., assignor to United Audio Visual Corporation, Mays Landing, N.J.

Filed July 9, 1974, Ser. No. 486,805
Int. Cl.² H04P *3/00*
U.S. Cl. 340—147 P **20 Claims**



1. Apparatus for simultaneously controlling the operational states of a plurality, *p*, of devices in response to pre-programmed information stored in *m* channels of a memory device, where *m* is an integer and $m < p$, comprising:

means for generating *m* digital signals in response to said pre-programmed information;

means for combining *n* of said *m* digital signals *j* signals at a time, where *j* is an integer including zero and has a maximum value equal to *n*, and for generating a set of encoded signals representing the combinations of said *n* digital signals;

means for gating said set of encoded signals with the remaining $(m - n)$ digital signals generated in response to said pre-programmed information to produce a plurality, *p*, of output signals, where $p > m$;and

means for simultaneously controlling the operational states of the plurality, *p*, of devices in response to said *p* output signals.

4,020,465

THERMAL LINE PRINTER

Michael J. Cochran, Richardson, and Stephen P. Hamilton, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 26, 1973, Ser. No. 428,492
Int. Cl.² G06F *3/12*; H04L *15/24*
U.S. Cl. 340—172.5 **10 Claims**

1. A semiconductor printer system for a thermal line printer where a plurality of heaters are provided in a linear array arranged in groups, each said group having a first number of heaters and like-positioned heaters in each of said groups having one side thereof electrically connected in common, and where a motor is provided for stepping a second number of times thermally sensitive paper past said linear array during the printing of a line of characters, said system comprising:

a. storage means to store a set of a multibit words, one word for each character to be printed on a given line;

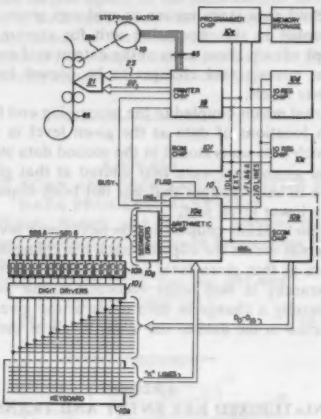
b. commutator means to read cyclically said set of words from said storage means at least a third number of times for each line of characters to be printed, said third number being equal to the product of said first and second numbers;

c. a random access ROM having therein a dot matrix code for each different character;

d. a time sequencer and decoder connected to said ROM and synchronized with said commutator to produce a different one bit output from said ROM each time one of said words is read from said ROM;

e. a set of first enable circuits, each first enable circuit leading from said ROM to one of the groups of said heaters;

f. a set of second enable circuits, each second enable circuit leading from said time sequencer to one of said like-positioned heaters in each of said groups; and



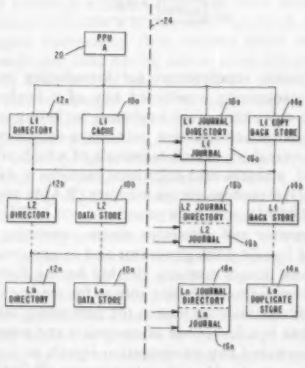
g. decoder means interfacing said time sequencer to said like-positioned heaters and to said motor to enable said heaters, one heater per group for each said set of words read from said storage means, like-positioned heaters being simultaneously energizable, and to step said motor after said set of words has been read from said storage means said first number of times.

4,020,466

MEMORY HIERARCHY SYSTEM WITH JOURNALING AND COPY BACK

Vincent Anthony Cordi, Vestal, and Bruce Adam Edson, Apalachin, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed July 5, 1974, Ser. No. 486,043
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **6 Claims**



1. In a multi-level hierarchical memory system made up of a lowest level with a first data store means for storing the data base of the memory system and a plurality of sequentially higher levels each level having a different first data store means for storing at that level a portion of the data contained in the first data store means at the next lower level in the hierarchy and also changes of addition or modification to units

of said data made by computer instruction from a processing unit to be copied back to said next lower level because said changes are not contained in the first data store means in the next lower level, an improvement in the means of copying back from any given level of the sequentially higher levels into the next lower level said changes at said given level comprising:

a second data store means at said any given level that is coupled to the processing unit for storing a duplicate copy of only those units of the data at said any given level that contain said changes to be copied back down to lower levels;

a journal means coupled to the processing unit for recording the locations of data at the given level in the order in which data units stored in the second data store means at said given level were first altered at that given level by one of said changes that has not been copied back into any lower level; and,

copyback means coupled to the next lower level and to the journal means for copying back the changes made in the data at that given level into the next lower level in the hierarchy in said order recorded in the journal means whereby a change in data made at the given level is reflected in the data at the lower levels of the hierarchy.

4,020,467

MINIATURIZED KEY ENTRY AND TRANSLATION CIRCUITRY ARRANGEMENT FOR A DATA PROCESSING UNIT

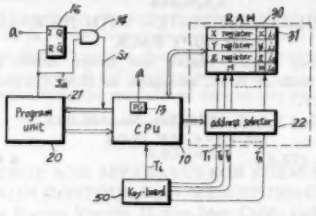
Shintaro Hashimoto, and Tosaku Nakanishi, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sept. 27, 1974, Ser. No. 509,951

Claims priority, application Japan, Sept. 28, 1973, 48-109743; Oct. 9, 1973, 48-113661; Nov. 19, 1973, 48-130513

Int. Cl.² G06F *3/02*

U.S. Cl. 340—172.5 **8 Claims**



1. A circuit arrangement for introducing as identifying signal characterizing a selected key of a keyboard into an electronic calculator, said keyboard including a plurality of digit entry keys and function entry keys each having first and second terminals, said first terminals of which are commonly connected, wherein said calculator includes a data processor unit (CPU), a random access memory (RAM) and a read only memory (ROM), said data processor unit (CPU) including a pulse generator and a counter means consisting of an adder controlled by said pulse generator and an accumulator means, said random access memory (RAM) having first and second modes of operation including means for storing operand data and an address selector means for generating address signals for said data in a first mode of operation and means for generating time-shared key interrogation signals in a second mode of operation, and said read only memory (ROM) including a program storage means for storing program instructions for controlling the data processor unit, said circuit arrangement comprising:

a. means for coupling said address selector means contained within the random access memory (RAM) with said second terminals of the keyboard so that address signals generated in said second mode by said address selector means are respectively coupled as key strobe time-shared key interrogation signals with the respective second terminals of the keys;

b. means for applying the key interrogation signals to said counter means contained in said data processor unit by means of a selected key of said keyboard thereby providing a desired code signal constituting a representation of identity of the selected key;

c. input buffer means contained within said random access memory for storing said code signals representing the identity of a selected key; and

d. means for applying said code signals generated by said counting means to said input buffer means.

4,020,468

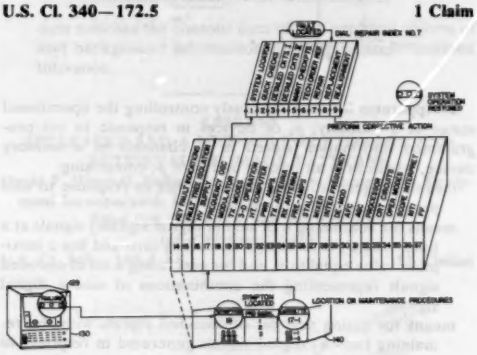
COMPRESSED INFORMATION SYSTEM

Paul W. Silver, Bowie; Richard A. Fuselier, Millersville, and William B. Moore, III, Baltimore, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1974, Ser. No. 531,491

Int. Cl.² G06F *3/14, 3/16*; G09B *7/00*

U.S. Cl. 340—172.5 **1 Claim**



1. The method of repairing apparatus by utilizing a maintenace system which includes, (a) data storage means wherein coordinated audion and visual data comprising visual and audio presentation of maintenance procedures relate to said apparatus are stored, (b) audio reproduction and visual display means, and (c) data retrieval mean spermitting the selective recovery of said stored data to activate said audio reproduction means and said visual display means, the method comprising the steps pf:

1. utilizing a symptom of a malfunction of said apparatus for the selective recovery of said stored data by index in said data retrieval means to the beginning of one of said maintenance procedures;

2. activating said audio reproduction meas and said visual diaplay means in response to said indexing so as to generate a visual display and audio description of the selected maintenance procedure for use in correcting said malfunction.

4,020,469

PROGRAMMABLE ARRAYS

Frank Manning, Apartment 6, 30 Littell Road, Brookline, Mass. 02146

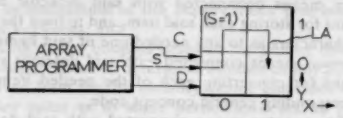
Filed Apr. 9, 1975, Ser. No. 566,304

Int. Cl.² G06F *13/00*; G11C *5/02, 5/06, 7/00*

U.S. Cl. 340—172.5 **27 Claims**

1. An array comprising iterative units in which each of said units includes memory means, plural input and output means, means for storing information in the memory means from selected input means, means dependent upon the information stored in said memory means for selecting output means, and means for transmitting information from selected input means through said unit to the selected output means, each iterative

unit having particular output means uniquely connected to particular input means of other predetermined iterative units



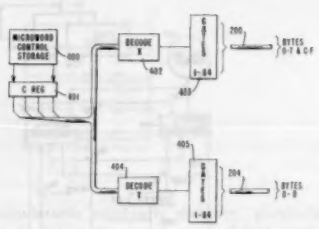
discretely, whereby the selection of a particular output means of a unit permits the transmission via that unit of information to be stored in a selected discrete other unit.

4,020,470

SIMULTANEOUS ADDRESSING OF DIFFERENT LOCATIONS IN A STORAGE UNIT

Edward George Drimak, Johnson City, and Thomas Arthur Metz, Endicott, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 6, 1975, Ser. No. 584,551
Int. Cl.² G11C 7/00
U.S. Cl. 340—172.5 **1 Claim**



1. In a data processing system with a memory system in which data in a block of information is accessed by a control word which has a first section that translates into a portion called the segment field that identifies the block of information containing the data and an entirely different second section that translates into a portion called a displacement field that pinpoints the location of the data within that block, apparatus for receiving that control word and translating it to a real location within the memory system that can be accessed to obtain the data comprising:

a first register for receiving the control word from the data processing system containing a first portion which receives the segment field and a second portion which receives the displacement field;

a local storage unit made up of a plurality of modules each having a plurality of locations containing data for translating control words to actual addresses in the memory system and supplying output signals reprsentative of such data when the local storage unit unit is accessed, said local storage unit including a first group of modules containing data for translating the segment field portion of the control word into part of the actual address and a second group of modules containing data for translating the displacement field portion of the control word into part of the actual address,

a first and second decoding means coupled to the first register and said local storage unit for simultaneously and separately accessing the two separate first and second groups of modules respectively in said local storage unit when supplied with a control word from the first register, said first decoding means being coupled only to the first portion of the first register containing the first section of the control word and to said first group of modules in the local storage unit containing data translating said first section to a segment field and said second decoding means coupled only to the second portion of the first register containing the second section containing a translation of the second section into the displacement field, and;

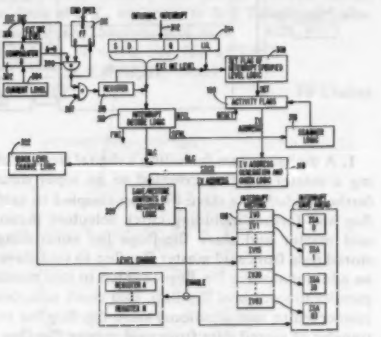
a second register coupled to both the first and second group of modules in said local storage unit for simultaneously storing the output signals of the local storage unit representative of both the segment and displacement fields to form the address of the accessed data in the memory system whereby the displacement and segment fields are independently supplied to the second register.

4,020,471

INTERRUPT SCAN AND PROCESSING SYSTEM FOR A DATA PROCESSING SYSTEM

William E. Woods, Natick, and Philip E. Stanley, Westboro, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 30, 1975, Ser. No. 591,905
Int. Cl.² G06F 9/18
U.S. Cl. 340—172.5 **16 Claims**



1. In a data processing system having a plurality of interrupt sources, interrupt processing apparatus comprising:

A. means for receiving an interrupt signal from one of said sources, said interrupt signal indicative of one of a plurality of interrupt levels, said levels numbered so that a first number indicates a highest interrupt level and so that a last number indicates a lowest interrupt level, said interrupt signal comprising first, second third and fourth fields, each said field having one or more bits of information, said first, second and third fields each capable of having first and second states for indicating an operation to be provided for said interrupt source from which said interrupt signal is received, and said fourth field indicating the interrupt level number of said interrupt source from which said interrupt signal is received;

B. interrupt flag register means having a plurality of flag locations equal in number to the number of said interrupt levels, said flag locations numbered in correspondence with the respective numbers of said interrupt levels;

C. means, responsive to said interrupt signal, for activating a one of said flag locations corresponding in number to the level number indicated by said interrupt signal;

D. scanning means, responsive to the receipt of said interrupt signal by said means for receiving, for determining which one of said flag locations is an activated location having the highest interrupt level relative to any other activated flag locations; and

E. means, responsive to said scanning means, for enabling interrupt service for a one of said sources associated with the one of said flag locations which is indicative of the highest activated interrupt level as determined by said scanning means.

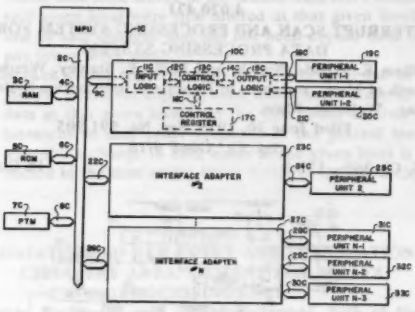
4,020,472
MASTER SLAVE REGISTERS FOR INTERFACE ADAPTOR

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Edward C. Hepworth, Apache Junction, all of Ariz.; Wilbur L. Mathys, Norristown, Pa.; William D. Mensch, Jr., Norristown, Pa.; Rodney H. Orgill, Norristown, Pa.; Charles I. Peddle, Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 519,149, Oct. 30, 1974. This application Sept. 17, 1975, Ser. No. 614,114

Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **4 Claims**



1. A digital system including a digital storage circuit including a master flip-flop coupled to an input data source and further including a slave flip-flop coupled to said master flip-flop and further including clock selection means coupled to said master and slave flip-flops for controlling transfer of stored data from said master flip-flop to said slave flip-flop and an additional slave flip-flop coupled to said master flip-flop in parallel to said slave flip-flop, said clock selection means also connected to said additional slave flip-flop for controlling the transfer of stored data from said master flip-flop to said additional slave flip-flop.

4,020,473
AUTOMATIC SYSTEM FOR PROVIDING TELEPHONE NUMBER INFORMATION SERVICE

Eiji Fujimura, 24-4, Shinohara-dai, Kohuku Yokohama, Japan

Continuation-in-part of Ser. No. 396,306, Sept. 11, 1973, abandoned, which is a continuation of Ser. No. 162,236, July 13, 1971, abandoned, which is a continuation-in-part of Ser. No. 834,226, June 11, 1969, abandoned, which is a continuation-in-part of Ser. No. 730,973, April 25, 1968, abandoned, which is a continuation-in-part of Ser. No. 438,325, March 9, 1965, abandoned. This application Dec. 22, 1975, Ser. No. 642,760

Claims priority, application Japan, Mar. 11, 1964, 39-13453

Int. Cl.² G06F *7/10, 15/02, 15/40*

U.S. Cl. 340—172.5 **5 Claims**

1. An apparatus for providing telephone numbers in response to inquiries, comprising:

at least one input device for use by operators to supply inquiry information including a format control symbol for an inquiring index;

at least one output device for use by operators to receive information in response to inquiries;

at least one file memory device to which random access can be gained for storing data entries;

at least one central processor for carrying out a mathematical and logical computation, in particular a comparing operation, said central processor having:

an index shaping device coupled to said input device and comprising:

detector switching means to identify the breaks between items in the inquiry information and switch the items to registers for each said item,

register means connnected with said detector switching means for storing each said item, and to limit the number of characters as to any needed one of said items,

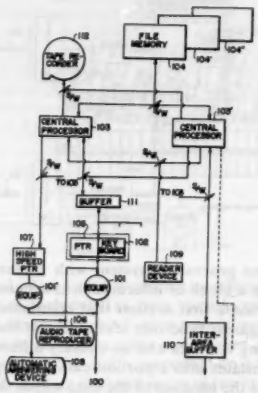
conversion means connected with said detector switching means for converting each of the needed items into a corresponding generic concept code,

a further register means connected with said conversion means for storing each of said generic concept codes,

an integrating register means connected with said register means and further register means to integrate each item to shape a set of inquiry items comprised of the inquiry index, a desk and question number, and a format control symbol, and

a directing means connected to said register means and said further register means parallel with said switching means to recognize a format-control symbol in the inquiry information to control the order of transmission of said generic codes from said further register means to said integrating register means;

a dividing device coupled to said integrating register means to separate the inquiry index from said set of inquiry items and to register said inquiry index;



a joining device coupled to the dividing device and the output channel of said file memory device to receive and combine the set of inquiry items with response data from the file memory device;

a comparison device, which comprises:

random access storage means having storage cells to store keywords that are prepared in the same format as the inquiry index item, and having a control unit,

a further storage means to store area-unit numbers corresponding to said keyboards and having storage cells corresponding to the storage cells in said random access storage means on a one for one basis,

comparing means coupled to both said storage means to determine the position of an inquiry index among a plurality of keywords, stored in the random access storage means, which respectively correspond to the storing areas of the file memory device,

address calculating means connected with the comparing means and the control unit of the random access storage means, to calculate the memory address of the next keyword in accordance with a latest comparison result "larger" or "smaller" than the inquiry index,

keyword registering means coupled between said random access storage means and said comparing means, to receive and store the keyword for the next comparison step, and

area-built number registering means connected to the file

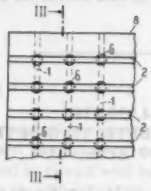
memory device to receive and store area-unit numbers corresponding to the keywords, and to transmit the contents thereof to the file memory device at the time of determination of the inquiry index position among the keywords; and

a checking device coupled between the joining device and the output device to determine whether or not a response received from the file memory device coincides with the inquiry index as to some particular items, to pass the coincident data to the output device, and to transmit a signal of "No-answer" to the output device when there is no coincident datum.

4,020,474
MANIPULATABLE READ-OUT MEMORY

Juergen Meyer, Taunusstein, and Irmtrud Wendling, Wiesbaden, both of Germany, assignors to Heimann GmbH, Germany

Filed May 27, 1975, Ser. No. 580,919
Claims priority, application Germany, May 27, 1974, 2425467; Mar. 7, 1975, 7507226
Int. Cl.² G11B 7/24; G06K 7/14
U.S. Cl. 340—173 SP **13 Claims**



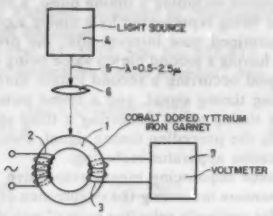
1. In a manipulatable read-only memory, particularly a punched card read device, having a group of first conductors and a group of second conductors, one group forming row conductors and the other group forming column conductors, which are disposed in a matrix formation in the manner of a cross-bar distributor, with each first conductor intersecting the second conductors at respective intersection points, the combination of each pair of first and second conductors being operatively connected in the vicinity of their intersection point by a corresponding series connected photo-resistor and a rectifier containing a blocking contact, said blocking contact being formed directly on the first conductor and directly connecting the latter, in blocking manner, to the photo-resistor, the photo-resistor being in the form of a crystal which extends through a monogranular supporting foil, the second conductor being vapor deposited in the form of beam-transmissive strips, upon one of the two sides of the foil, and the first conductor being vapor deposited upon the other of the two sides of the foil.

4,020,475
MAGNETIC DEVICE OPERATING WITH THE PHOTOMAGNETIC EFFECT

Frederik Karel Lotgering, and Petrus Helena Gerardus Maria Vromans, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 17, 1975, Ser. No. 623,314
Claims priority, application Netherlands, Nov. 18, 1974, 7414976
Int. Cl.² G11C 11/02
U.S. Cl. 340—174 YC **7 Claims**

1. A magnetic device having a radiation-sensitive element which comprises a magnetisable material having garnet structure and of which a magnetic parameter can vary under the influence of electromagnetic radiation, the device comprising means to direct electromagnetic radiation onto the radiation-sensitive element, and a magnetic state sensing means to detect a variation in a magnetic parameter of the magnetisable material, said magnetisable material being cobalt doped yttri-

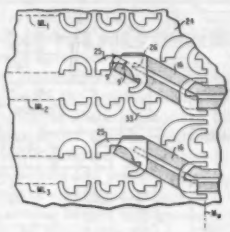


um-iron garnet having at most 0.02 cobalt atoms per formula Unit.

4,020,476
MAGNETIC BUBBLE MEMORIES WITH NONOBSTRUCTING CROSSINGS BETWEEN CONDUCTOR AND PERMALLOY PATTERNS

Peter Istvan Bonyhard, Edison, and James Lanson Smith, Bedminster, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 4, 1976, Ser. No. 655,257
Int. Cl.² G11C 19/08
U.S. Cl. 340—174 TF **10 Claims**



1. A magnetic bubble memory comprising a layer of material in which magnetic bubble patterns representative of information can be moved, a first pattern of electrical conducting material overlaying said layer, a second pattern of magnetically soft elements overlying said conductor pattern and defining a first path along which said bubble patterns move in response to a magnetic field reorienting cyclically in the plane of said layer, said path including a reference position to which a bubble is moved when said in-plane field is oriented in about a first direction, said first and second patterns defining a crossing at said reference position at which magnetic poles inhibitive of the movement of said bubble occur, said first and second patterns having geometries such that said reference position is occupied by a bubble at a time different from that at which said poles occur during each of said cycles.

4,020,477
RADIO CENTRAL STATION ALARM SYSTEM

John M. Holland, Shawsville, Va., assignor to American District Telegraph Company, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,547
Int. Cl.² G08B 1/08
U.S. Cl. 340—224 **15 Claims**

15. A radio central station alarm system including a central station and a plurality of remote stations for transmitting alarm signals to the central station by means of radio signals encoding repetitive data words, each of said remote stations including a plurality of alarm sensors for detecting the occurrence of a respective one of a plurality of alarm conditions at the remote station, each of said data words including a first

plurality of bits identifying the remote station originating it, a second plurality of bits identifying an alarm condition occurring at that remote station, and a frame pulse, each of said bits and frame pulses including a timing pulse, a bit having a first binary value being represented by a timing signal occurring a first predetermined time interval after the preceding timing signal, a bit having a second binary value being represented by a timing signal occurring a second longer time interval after the preceding timing signal, and a frame pulse being represented by a timing signal occurring a third still longer time interval after the preceding timing signal, comprising:

remote station apparatus including:

alarm sensor sequencing means responsive to any of said alarm sensors indicating the occurrence of an alarm condition for cyclically selecting each of said alarm sensors in turn and for producing a plurality of binary coded output signals identifying the selected alarm sensor;

data storage means for storing a plurality of bits identifying said remote station;

a first clock for producing timing signals at predetermined regular intervals;

gate means responsive to the output signal of said first clock for passing said timing signals when enabled and for inhibiting said timing signals when not enabled;

a first counter for counting the timing signals produced by sid first clock which are not passed by said gate means;

data sequencing means for cyclically selecting each of the bits stored by said data storage means and each of the binary signals produced by said alarm sensor sequencing means in turn and for producing a frame pulse initiating output signal intermediate the selection of a predetermined two of said bits and binary signals, said data sequencing means advancing in response to each timing signal passed by said gate means;

gate control means responsive to said data sequencing means and to said first counter for enabling said gate means when the bit or binary signal selected by said data sequencing means has a first binary value, for inhibiting said gate means until one timing signal is counted by said first counter when the bit or binary signal selected by said data sequencing means has a second binary value, and for inhibiting said gate means until two timing signals are counted by said first counter when a frame pulse initiating output signal is being produced; and

radio transmitter means responsive to said alarm sensor sequencing means for transmitting a radio output signal representative of the output signal of said gate means when said alarm sensor sequencing means selects an alarm sensor indicating the occurrence of an alarm condition; and

central station apparatus including:

radio receiver means for receiving said radio output signal and for producing a first data output signal including timing pulses corresponding to the timing signals in the received radio signal;

a shift register having a plurality of output terminals for applying an output signal to successive output terminals as said shift register is shifted;

means for shifting said shift register at a predetermined rate;

first means responsive to the occurrence of a timing pulse in said first data signal for producing a second data output signal having a first binary value if said shift register is applying an output signal to a first output terminal when said timing pulse occurs and having a second binary value if said shift register is applying an output signal to a second output terminal when said timing pulse occurs and for subsequently presetting said shift register;

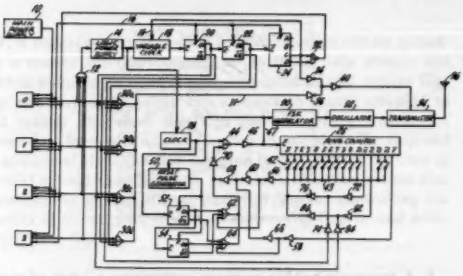
means for storing said second data output signal as one of the successive bits in a data word being received;

means for counting the timing pulses in said first data output signal;

second means responsive to the occurrence of a timing pulse in said first data output signal for producing an output signal indicating that a frame pulse has been received if said shift register is applying an output signal to a third output terminal when said timing pulse occurs and for subsequently presetting said shift register;

means responsive to the output signal of said second means for producing a control transfer output signal if the number of pulses registered by said means for counting equals said predetermined number and for subsequently resetting said means for counting; and

means responsive to said control transfer output signal for producing an alarm output indication corresponding to the data word stored in said means for storing.



4,020,478

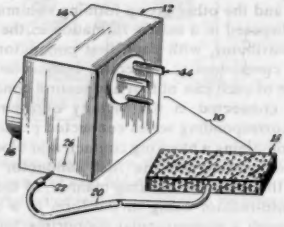
MOISTURE DETECTING DEVICE

Edward S. Hatfield, 1809 Arizona Ave., Fort Pierce, Fla. 33450

Filed Sept. 18, 1975, Ser. No. 614,416

Int. Cl.² G08B 21/00

U.S. Cl. 340—235 **5 Claims**



1. A device for detecting excessive moisture or absence of moisture in a particular area comprising:

a rigid, closed housing, said housing having a plurality of walls;

an electrical male plug connected to and projecting from one wall of said housing;

step-down transformer within said housing having its primary connected to said electrical plug;

thyristor gate means within said housing connected to the secondary of said transformer;

means for receiving moisture including a circuit connected to said thyristor gate means having a first electrode connected to said transformer secondary and second electrode connected to said thyristor gate means, said first and second electrodes being coupled to said moisture receiving means and spaced apart; and

electrically driven indicating means mounted to said housing connected to said secondary and said thyristor gate means whereby when moisture is received on said moisture receiving means a current across said first and second electrodes will actuate said thyristor gate providing power to said electrically driven indicator means.

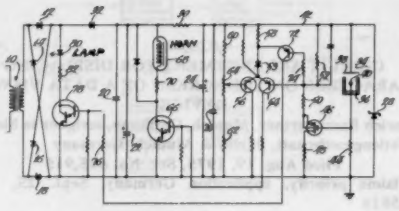
4,020,479
FIRE DETECTOR

Frederick J. Conforti, and Wilbur L. Ogden, both of Aurora, Ill., assignors to Pittway Corporation, Northbrook, Ill.

Continuation-in-part of Ser. No. 431.137, Jan. 7, 1974, abandoned. This application Feb. 7, 1975, Ser. No. 548,003

Int. Cl.² G08B 21/00

U.S. Cl. 340—237 S 24 Claims



1. In a detecting device including:

a power source;

sensor means for providing a sensor signal representative of a predetermined sensed condition, said sensor means being connected in circuit with said power source;

alarm means for providing an alarm when the predetermined condition is sensed, said alarm being connected in circuit with said power source;

the improvement comprising;

adjustable means for providing an adjustable reference signal for varying the sensitivity of said device, said adjustable means being connected in circuit with said power source;

indicator means for indicating the condition of said power source, said indicator means being connected in circuit with said power source;

first comparison means for comparing the amplitudes of the reference signal and the sensor signal, said first comparison means being connected to said power source, said sensor means, said adjustable means and said alarm means, said first comparision means providing a first signal for operating said alarm means when the sensor signal has a first predetermined relationship to the reference signal, said first comparison means providing a second signal when said sensor signal has a second predetermined relationship to the reference signal;

signal offsetting means connected to said first comparison means for increasing the amplitude of said second signal to a third signal; and

second comparison means for comparing the amplitudes of the third signal and the sensor signal, said second comparison means being connected to said signal offsetting means, the interconnection of said first comparison means and said sensing means, and said indicator means, said second comparison means operating said indicator means to indicate improper adjustment of said adjustable means, said first comparison means being incapable of operating said alarm means when the third signal has a predetermined relationship to the sensor signal;

whereby said indicator means indicates improper operation of said device should said power source fail, or should said adjustable means be improperly set.

4,020,480
CATALYTIC DETECTING APPARATUS FOR DETECTING COMBUSTIBLE GASES AND VAPORS

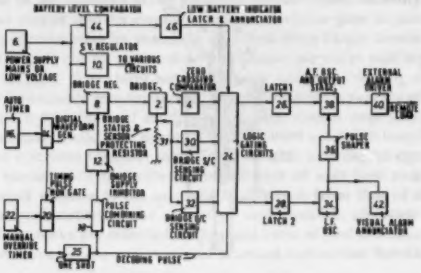
Paul Gotley, Harlow, and Howard Alfred Buckenham, Brentwood, both of England, assignors to Neotronics Limited, Stansted, United Kingdom

Filed Apr. 21, 1975, Ser. No. 570,073

Claims priority, application United Kingdom, Apr. 26, 1974, 18386/74

Int. Cl.² G08B 17/10

U.S. Cl. 340—237 R 11 Claims



1. Detecting apparatus comprising:

a. normally inactive sensing means selectively sensitive to the presence in a given environment of an extraneous constituent and operative to produce an electrical signal representative of the presence of the constituent, said sensing means requiring a period of time after actuation to achieve normal operation;

b. electrical signal translation means responsive on activation to the signal of the sensing means to produce an output signal indicative of the presence of the constituent in a concentration above a predetermined level,

c. activating means connected to the sensing means and arranged automatically and periodically to:

1. generate pulses of a duration sufficient to energize and stabilize the sensing means to normal operation, and

2. subsequently to deactivate the sensing means for a period which is at least as long as the said interval of activation;

d. fault detecting means for producing a fault signal in the event of circuit failure;

e. alarm means for providing a warning in response to the fault signal and in response to the output signal;

f. a one-shot generator means connected to the activating means to generate a one-shot pulse at the end of the pulses received from the activating means, the duration of the pulses of said one-shot generator means being independent of the duration of the pulses generated by the activating means and being insufficiently long to coincide with an external interference signal; and

g. logic gating circuits connected to receive the pulses from said one-shot generator means and to gate signals from said signal translation means and said fault-detecting means simultaneously.

4,020,481
FLUID LEVEL ALARM DEVICE

Tadao Nakagawa, Ueda, Japan, assignor to Nisshin Kogyo Kabushiki Kaisha, Ueda, Japan

Filed Jan. 14, 1976, Ser. No. 649,156

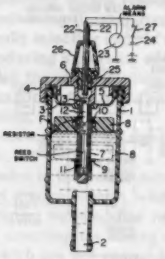
Claims priority, application Japan, Feb. 25, 1975, 50-26096[U]

Int. Cl.² G08B 21/00

U.S. Cl. 340—244 E 1 Claim

1. A fluid level alarm device comprising a fluid tank adapted to be connected with a master cylinder, said fluid tank having an open top portion, a cap member detachably secured to said

open top portion, a hollow switch cylinder integrally formed with said cap member and extending therefrom in a generally vertical direction, a float member arranged to float on an operating fluid stored in said fluid tank and fitted over said switch cylinder for vertical sliding movement relative thereto, a magnet carried by said float member, a switch base plate mounted within said switch cylinder and having a lower end abutting against the interior surface of the bottom of said switch cylinder, said plate having a pair of current paths printed on one side thereof and a respective connector terminal formed on each of said current paths in a respective predetermined fixed position, a reed switch having a pair of end



terminals respectively and firmly secured to one of said connector terminals of said current paths and operable to be closed under the influence of the magnetic force exerted by said magnet when said float member falls below a certain predetermined level, a source of electrical energy, an alarm means electrically connected to said source of electrical energy, a first lead line connected at one end to one of said current paths and at the other end to said alarm means, and a second lead line connected at one end to the other of said current paths and at the other end of said source of electrical energy, both of said lead lines extending from said respective current paths through, and fixedly supported by, said cap member.

4,020,482

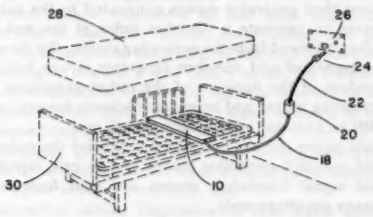
PATIENT MONITOR

Erich J. Feldl, 1516 Tenth St. Court, Manhattan, Kans. 66502

Filed Apr. 19, 1976, Ser. No. 678,460

Int. Cl.² G08B *21/00*

U.S. Cl. 340—279 **1 Claim**



1. A patient monitor alarm system that is placed below a bed patient and actuated by the weight of the patient so as to be sensitive to major changes in the patient's position to actuate a remote signal when said major changes occur, comprising:

a flexible sealed enclosure which is filled with a fluid and placed under the patient,

a pressure switch responsive to the pressure in said enclosure to close when the pressure is lowered below a preset level,

a remote electrically operated signal that is energized by the closing of said switch, and

wherein the weight of a patient compresses the fluid in the enclosure and raises its pressure above said preset level to hold the switch open, but removal of the patient's weight allows the switch to close, energizing the signal, further comprising:

a pair of pressure plates between which the enclosure is located to give mechanical advantage to said weight by increasing the surface area sensing said weight and thereby raising the pressure in the enclosure.

4,020,483

CIRCUIT ARRANGEMENT FOR DISPLACING CHARACTERS ON THE SCREEN OF A DATA VIEWING DEVICE

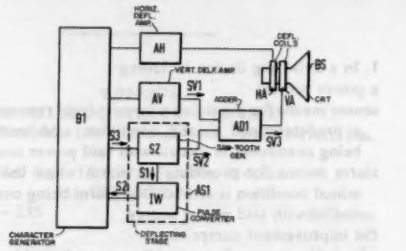
Heinrich Baumgartner, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 19, 1975, Ser. No. 605,915

Claims priority, application Germany, Sept. 25, 1974, 2445816

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 AD **5 Claims**



1. In a data system in which a circuit arrangement displaces characters representing an image content on the screen of a data viewing device, the characters being produced by a character generator and presented in a plurality of rows and a plurality of columns on the screen, and in which an electron beam is moved over the screen in the vertical direction by a first deflecting signal and in the horizontal direction by a second deflecting signal applied to respective deflection circuits and produced by a respetive first and second deflection stages under the control of the character generator, which may be stepped through a character sequence, the improvement therein comprising:

a third deflection stage connected to the character generator and operable to produce a third, saw-tooth deflection signal having an amplitude which is equal to the value of one of the first and second deflection signals and a repetition rate that is significantly less than the image change frequency, and to produce, at the maximum amplitude of the third deflection signal, a pulse to step the character generator; and

an adder connected between the one of the first and second deflection stages corresonding to the deflection signal having the amplitude equal to that of the third deflection signal and the respective deflection circuit and connected to said third deflection stage to add said third deflection signal with the associated one of said deflection signals to provide a composite signal which causes, in consecutive intervals of time, the uniform addition of parts of the image content at one edge of the screen and the removal of corresonding parts of the image content at the opposite edge of the screen to provide a continuous and uniformly moving image on the screen.

4,020,484

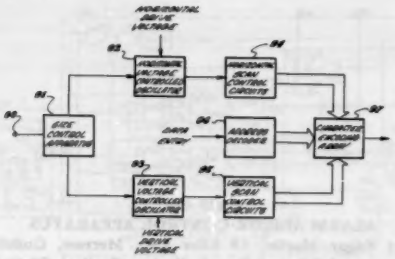
SEGMENTED CHARACTER GENERATOR FOR USE WITH A TELEVISION RECEIVER

Fred W. Caspari, South Bend, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.

Continuation of Ser. No. 476,481, June 5, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,567

Int. Cl.² G06F 3/14

U.S. Cl. 340—324 AD **3 Claims**



1. Apparatus for displaying a character indicative of a selected television channel on the screen of a television receiver comprising:

a character generator having a first controllable oscillator and a second controllable oscillator, the frequency of said first controllable oscillator determining the horizontal size of a displayed character and the frequency of the second controllable oscillator determining the vertical size of a displayed character;

means for controlling the frequency of said first controllable oscillator and the frequency of said second controllable oscillator for causing said oscillators to operate at respective initial frequencies for a predetermined time, and at respective increasing frequencies after the predetermined time to cause a character to be displayed for the predetermined time at an initial size, and after the predetermined time to decrease in size, eventually disappearing.

4,020,485

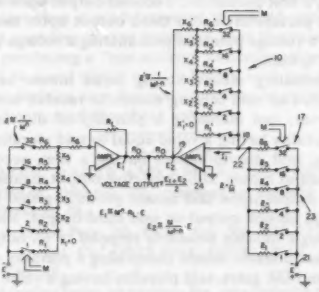
NON-LINEAR DIGITAL-TO-ANALOG CONVERTER FOR SERVO CIRCUIT

Edwin Stanley Busby, Menlo Park, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Apr. 3, 1972, Ser. No. 240,655

Int. Cl.² H03K 13/04

U.S. Cl. 340—347 DA **5 Claims**



4. A non-linear digital to analog converter comprising a first terminal; a second terminal; a first shunt series resistive network connected between said first and second terminals including a plurality of series resistive elements serially connected together and coupled between said first and said second terminals, a plurality of shunt resistive elements each having one of its ends coupled to one of said terminals and the other of its ends coupled in circuit with said series elements so that each shunt element is coupled to the other of said terminals through at least one element, a switching means in said network coupled in series with each of said shunt elements and said one terminal and operative to selectively switch shunt elements into the network in accordance with a digital signal representing a quantity M, each switching means responsive to the state of one digit position of said digital signal, the values of said resistive elements are selected to provide a network impedance that non-linearly varies monotonically as the inverse of the quantity M; an amplifier circuit means defining an input circuit and an output circuit and whose gain is principally determined by the ratio of a first impedance means in said output circuit to a second impedance means in said input circuit, said first shunt series resistive network forming said first impedance means; and an additional shunt series resistive network forming said second impedance means, said switching means in said first named and additional networks coupled to be operable together in accordance with said digital signal, the variation of the network impedance of said first named network relative to the quantity M different from that of said additional network, the values of said resistive elements of said networks are selected so that said ratio of first and second impedance means varies as said selected conversion function.

4,020,486

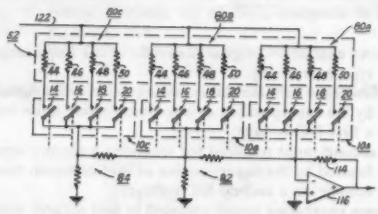
SOLID STATE DIGITAL-TO-ANALOG CONVERTER

James J. Pastoriza, Lincoln, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Continuation of Ser. No. 569,576, April 18, 1976, abandoned, which is a continuation of Ser. No. 348,199, April 5, 1973, abandoned, which is a division of Ser. No. 102,854, Dec. 30, 1970, Pat. No. 3,747,088. This application Dec. 22, 1975, Ser. No. 642,692

Int. Cl.² H03K 13/04

U.S. Cl. 340—347 DA **8 Claims**



1. A digital-to-analog converter comprising:

a circuit board;

first and second identical substrates mounted on said circuit board, each of said substrates comprising a chip of semiconductor material formed with a set of separate IC transistors;

a third substrate mounted on said circuit board independently of said first and second substrates, said third substrate having first and second identical sets of resistors deposited thereon with each set comprising a set of connection terminals equal in number to the number of transistors of said first and second substrates, respectively, and having ohmic resistances in accordance with a predetermined pattern;

power supply circuit means for supplying electrical power to all of said transistors;

conductive means on said circuit board providing interconnection between said transistors and said power supply circuit means, and also between the sets of transistors of said first and second substrates and said first and second sets of connection terminals, respectively, to connect said transistors as individual current sources and to fix the current through each transistor in accordance with a

preselected binary weighting pattern, said first and second substrates thereby presenting, in combination with said third substrate, first and second identical sets of individually-activatable current sources;

digital input means to receive a digital input and coupled to said transistors to activate said current sources selectively in accordance with the digital input; and

analog output means coupled to said transistors to produce an analog output current representing the sum of currents contributed by all of the current sources activated in accordance with the digital input, said analog output means including attenuation means to reduce the magnitude of current contributions from said second set of current sources by a predetermined factor prior to being combined with the current contributions from said first set of current sources.

4,020,487

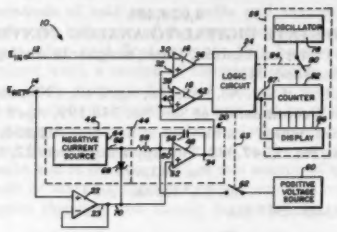
ANALOG-TO-DIGITAL CONVERTER EMPLOYING COMMON MODE REJECTION CIRCUIT

Arthur J. Winter, Encino, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Continuation-in-part of Ser. No. 627,718, Oct. 31, 1975, abandoned. This application Mar. 30, 1976, Ser. No. 671,844

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 NT **10 Claims**



1. An analalog-to-digital converter of the single slope detection type comprising:

a first input terminal for receiving a first input signal formed by the superposition of a common mode noise voltage on a first DC voltage;

a second input terminal for receiving a second input signal formed by the superposition of said common mode noise voltage on a second DC voltage;

ramp generating means coupled to said second input terminal and receiving said second input signal; said ramp generating means operative to isolate said common mode noise voltage from said second input signal and to develop a ramp reference signal that is modulated by said common mode noise voltage;

a first comparator having a first input connected to said first terminal for receiving said first input signal, a second input for receiving the modulated ramp reference signal and a first output, said first comparator being responsive to said first input signal and said modulated ramp reference signal and operative to produce a first output signal on said first output which changes state when the voltage level of the modulated ramp reference signal exceeds the voltage level of said first input signal;

a second comparator having a third input connected to said second terminal for receiving said second input signal, a fourth input for receiving the modulated ramp reference signal and a second output, said second comparator being responsive to said second input signal and said modulated ramp reference signal and operative to produce a second output signal on said second output which changes state when the voltage level of the modulated ramp reference signal exceeds the voltage level of said second input signal; and

a logic circuit coupled to said first and second outputs, said logic circuit being responsive to said first and second output signals and operative to produce a pulse having a duration that corresponds to the time difference between the changes of state of said first output signal and said second output signal, such duration being indicative of the voltage difference between said first input signal and said second input signal.

4,020,488

ALARM AND/OR CONTROL APPARATUS

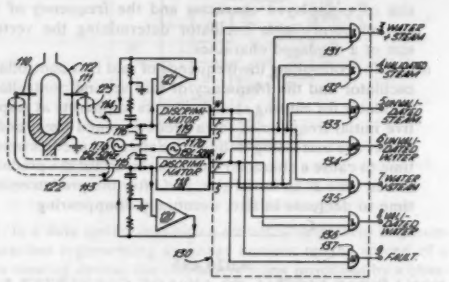
Robert Edgar Martin, 19 Elles Ave., Merrow, Guildford, Surrey, and Edmond Francis Hasler, 'Peplea', 75 Oakhill Road, Ashstead, Surrey, both of England

Filed May 7, 1973, Ser. No. 358,166

Claims priority, application United Kingdom, May 10, 1972, 21929/72

Int. Cl.² G08B *19/00;* **H04Q** *3/00;* **E03B** *7/07;* **F16K** *37/00*

U.S. Cl. 340—412 **7 Claims**



1. Apparatus for indicating a condition of and/or controlling a medium within a system by sensing a presence of a plurality of parameters of said medium and said system comprising:

a. sensing means insulatively carried by said system in contact with said medium including a plurality of sensors having an output means to produce a first output upon sensing a first parameter, a second output upon sensing a second parameter, and a third output upon said sensor having a voltage potential proximating a voltage potential of said system,

b. discriminating means having input means selectively connected to said sensing means to receive said output therefrom, and including a plurality of discriminators, said plurality having a value equal to said plurality of said sensors, said discriminators having a first, second, and third output means, said respective output means producing an output upon said sensor producing said first output, said second output or said third output, and

c. basic logic module means to respond to an output from said discriminator means comprising a plurality of sets of AND and OR gates, said plurality having a value less than said plurality of discriminators, said gates having input means selectively connected to said first, second and third output means of said discriminators and having output means producing an output upon receiving a selected input,

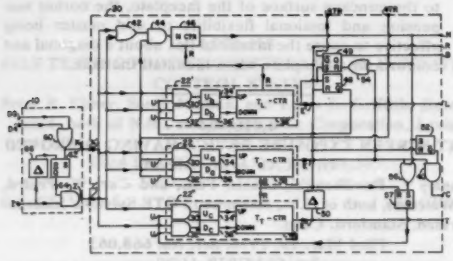
wherein said system can be controlled as a function of said control outputs of said gates.

4,020,489

SEQUENTIAL OBSERVER MULTI-FUNCTIONAL FRIEND ACCEPT DECIDER

Walton B. Bishop, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 25, 1975, Ser. No. 599,203
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 LC 4 Claims



3. A Friend-Accept decision making system for determining whether a set of replies to valid interrogations from an Identification-Friend-or-Foe system emanate from a friend or enemy, comprising:

first means for generating, upon receipt of a correct reply in response to an interrogation, a first digital signal having a value of one;

second means for generating, upon receipt of other than a correct reply in response to an interrogation, a second digital signal having a value of one;

means coupled to said first and second signal-generating means for counting the number of interrogations transmitted and for producing an N-count signal upon counting a predetermined number N of interrogations;

first multiplying means coupled to said first signal-generating means for forming a first product by multiplying said first signal by a predetermined weighting value U_a;

second multiplying means coupled to said second signal-generating means for forming a second product by multiplying said second signal by predetermined weighting value D_a;

means coupled to said first and second multiplying means for accumulating an accept decision sum, said accept decision sum comprising said first products from which are subtracted said second products; and

means coupled to the outputs of said accept-decision sum-accumulating means and said counting means for generating a "Friend-Accept" indication signal whenever said accumulated accept decision sum becomes equal to or greater than a predetermined threshold value T_a before said counting means produces said N-count signal, and for producing a "not-accept" indication signal whenever said N-count signal occurs before said accumulated accept decision sum becomes equal to or greater than said predetermined threshold value T_a.

4,020,490

TRAFFIC RADAR AND APPARATUS THEREFOR

Keith Millard, Decatur, Ill., assignor to Decatur Electronics, Inc., Decatur, Ill.

Filed Nov. 20, 1974, Ser. No. 525,477
Int. Cl.² G01S 9/44; G01R 23/14
U.S. Cl. 343—8 19 Claims

9. In doppler radar apparatus for determining the speed of a vehicle the combination comprising:

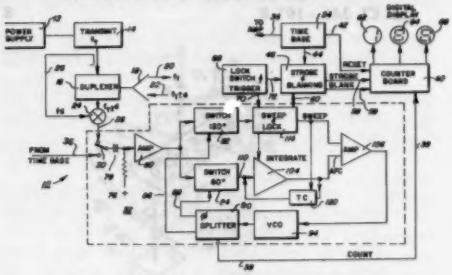
input means for providing an input signal having a frequency related to the speed of such vehicle,

source means for generating a synthetic signal of variable controllable frequency,

gate means receiving said input signal,

control means energized from said gate means and controlling the frequency of said source means,

sampling means controlled by said source means to control said gate means whereby said gate means applies said input signal to said control means for intermittent periods with a duty cycle less than 50% to equate the periodicity of said synthetic signal to the periodicity of said input



signal and eliminate harmonic ambiguities of said input signal,

digital counter and display means energized from said source means to generate a count related to the frequency of said source means, and

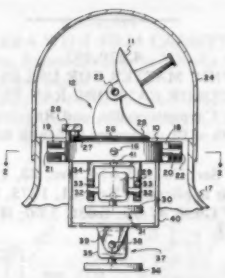
a timer means controlling the counting interval of said digital counter and display means whereby said count during said interval represents the speed of such vehicle.

4,020,491

COMBINATION GYRO AND PENDULUM WEIGHT PASSIVE ANTENNA PLATFORM STABILIZATION SYSTEM

Albert H. Bieser, Garland; William B. Stuhler, Plano, and Dorsey T. Smith, Garland, all of Tex., assignors to B. E. Industries, Garland, Tex.

Filed Oct. 7, 1974, Ser. No. 512,530
Int. Cl.² H01Q 1/18
U.S. Cl. 343—765 22 Claims



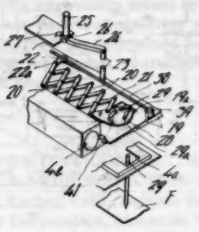
1. In a combination gyro and pendulum weight stabilized passive stabilization system: a platform structure pivotally mounted with respect to one or more pivotal axes lying in a pivotal axis plane and having a center of gravity below said pivotal axis plane; a gyro motor means and rotor means associated with at least one of said pivotal axes and pivotally mounted by pivot means in said platform structure on a gyro mounting pivotal axis substantially parallel to an associated reference axis which is perpendicular to an individual one of the pivotal axes of the pivotal mounting of said platform structure; with said gyro motor means and rotor means having precession restaining means; and when erect, the gyro rotor means being rotational in a plane normal to a vertical axis.

4,020,492

HAND-WRITING TYPE RECORDING DEVICE FOR A CAMERA

Horikomi Sumio, 5-10-11, Minami Shinagawa, Shinagawa, Tokyo, Japan

Filed Feb. 20, 1976, Ser. No. 659,595
Claims priority, application Japan, Mar. 20, 1975, 50-33649; Oct. 3, 1975, 50-120053
Int. Cl.² G01D 9/42; G03B 17/24
U.S. Cl. 346—107 R 8 Claims



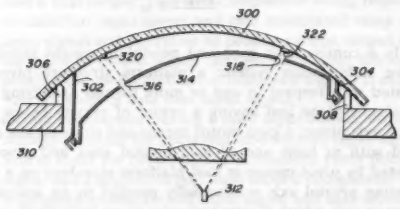
1. A hand-writing type recording device for use in conjunction with a camera having a hole in the rear plate comprising a rectangular casing having front, rear, end and side walls, said rear wall having a window adapted to be aligned with said hole in the rear plate of the camera, a horizontal partition plate extending to the longitudinal and transverse directions within said casing, information support means secured to the upper surface of said partition plate at a selected area thereof, hand-writing means disposed above said information support means and having a portion contacting the information support means, erasing means pivoted to the upper surface of said partition plate at another selected area thereof for erasing said information supported on the information support means, a resiliently supported carriage plate positioned below said partition plate for resilient vertical movement, information size reduction means pivoted at one end to said hand-writing means and supporting at the other end optical recording means, a display lamp mounted on one of said walls of the casing and electrical circuit means for synchronistrically energizing and deenergizing said optical recording means and display lamp.

4,020,493

PHOTOGRAPHIC MASTER FOR USE IN SCREENING A COLOR CATHODE RAY TUBE

Kazimir Palac, Carpentersville, and Raymond M. Stachniak, Wheaton, both of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Division of Ser. No. 535,614, Dec. 23, 1974, Pat. No. 3,975,198. This application Nov. 21, 1975, Ser. No. 634,201
Int. Cl.² G03B 41/00; G03C 5/00; H01J 29/80
U.S. Cl. 354—1 2 Claims



1. For use in the manufacture of rectangular color cathode ray tubes, and particularly for use in photoprinting a phosphor screen on a rectangular, three-dimensionally curved faceplate of a color cathode ray tube which has master mounting means in at least three corners thereof, a screening master comprising:

a rectangular, transparent, torsionally flexible substrate having a curvature corresponding substantially to the curvature of the faceplate, on the convex surface of which is disposed a screening master stencil pattern; and

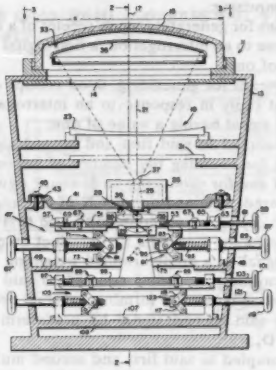
a master suspension element in at least three corresponding corners of said substrate for engaging said master mounting means to suspend said substrate in spaced adjacency to the concave surface of the faceplate, the corner suspension and torsional flexibility of said master being effective to cause the master to flex about a diagonal and conform to a faceplate when mounted thereon.

4,020,494

CRT SCREEN EXPOSURE DEVICE HAVING IMPROVED OPTICAL ALIGNMENT

Stanley L. Pawlikowski, Seneca Falls, and Carl W. Penird, Waterloo, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Mar. 18, 1976, Ser. No. 668,063
Int. Cl.² G03B 41/00
U.S. Cl. 354—1 10 Claims



1. An improvement in a cathode ray tube screen exposure device having an encompassing enclosure with a central axis therethrough and employing an internally positioned optical system oriented on an optical system axis offset from said central axis, said optical system including a light output area, related light means effecting a source of radiant energy and an associated spatially positioned reflective means, said system providing discrete exposure of a sensitized screen coating disposed on the interior surface of a CRT display panel positioned over an opening in said device, said panel having an $x - y$ plane delineated by x and y axes substantially coincident with the respective major and minor dimensions of the display area thereof and an interiorly oriented multi-apertured grid negative spacedly related to the screen portion thereof, said improvement being optical alignment means comprising:

mechanical means for achieving fine adjustable positional movement of said source of radiant energy relative to said light output area in an x related direction in a plane substantially normal to said optical axis and substantially parallel with the $x - y$ plane of said panel; and

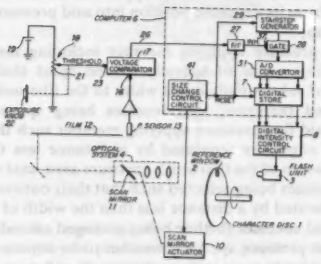
mechanical means for achieving fine adjustable positional movement of said source of radiant energy relative to said light output area in a y related direction in a plane substantially normal to said optical axis and substantially parallel with the $x - y$ plane of said panel; each of said respective adjustable movements being effected by indi-

vidual linkage means to separate control means located exteriorly of said enclosure whereby said radiant energy source is optionally optically aligned relative to said light output area.

4,020,495
SELF TESTING PHOTOTYPESETTER FLASH INTENSITY CONTROL SYSTEM

Peter R. Ebner, South Nashua, and Louis E. Griffith, Hampstead, both of N.H., assignors to Itek Corporation, Lexington, Mass.

Filed Dec. 29, 1975, Ser. No. 644,387
Int. Cl.² B41B *13/00*
U.S. Cl. 354—5 **18 Claims**



1. A system for establishing proper character illumination intensities in a phototypesetter for various character sizes comprising:

a. a character projection optical system for imaging a character upon a photosensitive medium;

b. a character image generator including a light source for producing character light images at the input of said character projection optical system;

c. a light intensity measuring means for measuring the intensity of light emerging from said character projection optical system;

d. a reference signal generating means;

e. a comparator for comparing the signal produced by said reference signal generating means and the signal produced by said light intensity measuring means and for producing an output signal when the signal produced by said light intensity measuring means assumes a given relationship with respect to the value of the signal produced by said reference signal generating means;

f. a reference image generating means including said light source for projecting a reference image through said character projection optical system and at said light intensity measuring means;

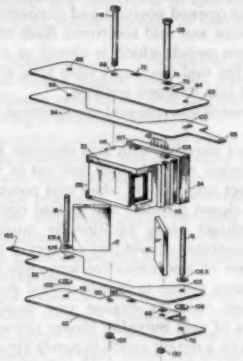
g. first light source intensity control means for causing said light source to sequentially illuminate said reference image generator at varying intensity levels until the value of the signal produced by said light intensity measuring means assumes said predetermined relationship with respect to the value of the signal produced by said reference signal generating means, thereby to cause said comparator to generate said output signal; and

h. second control means responsive to the generation of said output signal by said comparator for causing said first light source intensity control means to cease changing the intensity of light produced by said light source, thereby to establish the intensity of character images projected upon said photosensitive medium during typesetting.

4,020,496
SUPPORT FOR COMPONENTS OF AN AUTOMATIC FOCUSING SYSTEM

Dean M. Peterson, and John C. Wittenberger, both of Littleton, Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 11, 1975, Ser. No. 630,794
Int. Cl.² G03B *3/10, 13/20*
U.S. Cl. 354—25 **18 Claims**



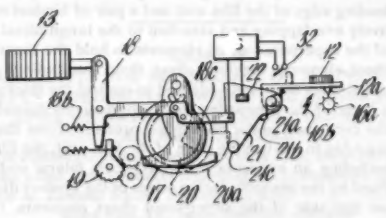
1. A support for an automatic focusing system comprising a pair of identical plates that are spaced apart and form an enclosure for said support, one of said plates having a plurality of openings that are in alignment with identical openings formed in the other plate, a pair of shafts positioned between said plates, each of said shafts extending through a different pair of said aligned openings in said plates, a separate image transferring mirror mounted on each of said shafts, and

an image receiving module positioned between said plates, said module having a plurality of plate retaining bosses on its surfaces adjacent said plates, said plates having additional pairs of aligned openings to receive said bosses in snug engagement therewith.

4,020,497
CAMERA WITH FILM CASSETTE

Hiroshi Ueda, Nara, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed July 23, 1974, Ser. No. 491,094
Claims priority, application Japan, Aug. 1, 1973, 48-86948
Int. Cl.² G03B *7/14*
U.S. Cl. 354—27 **4 Claims**



1. In a camera including:

an objective lens movable along its optical axis for focussing;

a shutter including movable blades relatively slowly movable from their closed to opened position to open said shutter and relatively rapidly movable from their opened to closed position to close said shutter;

means for opening said shutter in response to shutter release operation;

light sensitive means for generating an output commensurate with the brightness of an object to be photographed;

means for closing said shutter when a time period dependent on the output of said light sensitive means has passed after the opening of said shutter;

electronic flash means having an electronic flash tube and a firing circuit for firing said electronic flash tube;

a power source;

a power source switch manually operable to a closed position and an opened position and connected between said power source and said electronic flash means;

a synchronous switch which is closed to cause said firing circuit to fire said electronic flash tube when said shutter is brought into its open position,

the improvement wherein said synchronous switch comprising:

a first contact movable with said movable blades; and

a second contact movable into and out of the path of said first contact respectively when said power source switch is in said closed position and in said open position, said second contact being additionally movable along said path of movement of said first contact in accordance with the position of said objective lens, whereby, when said power source switch is in said closed position, said first and second contacts engage one another during the movement of said movable blades toward their opened position with a timing which depends upon the position of said second contact along said path of movement of said first contact.

4,020,498

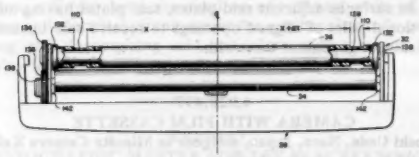
PHOTOGRAPHIC FLUID PROCESSING APPARATUS

Harvey S. Friedman, Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 28, 1975, Ser. No. 636,084

Int. Cl.² G03B *17/50*

U.S. Cl. 354—86 **3 Claims**



1. Photographic apparatus comprising:

means for locating at least one substantially rectangular flat self-processable film unit in position for exposure, the film unit including a pair of superposed sheet elements, a container of processing fluid positioned adjacent the leading edge of the film unit and a pair of binders respectively overlapping and attached to the longitudinal edges of the superposed sheet elements to hold the superposed sheet elements together along their longitudinal edges, the binders thus being adapted to control the thickness of a layer of the processing fluid progressively spread from the container, under an applied pressure, from the leading edge to the trailing edge of the film unit, the film unit including an exposure area having its lateral width defined by the inwardly facing edges of the binders disposed on one side of the superposed sheet elements, the inwardly facing edges of the binders disposed on the other side of the superposed sheet elements being laterally spaced apart a distance wider than the lateral width of the exposure area of the film unit, the film unit thus being adapted to have the layer of processing fluid spread between its superposed sheets extend laterally beyond its exposure area and beyond portions of its binders, the film apparatus defining a line coinciding with the longitudinal centerline of the film unit when the film unit is disposed in its exposure position by said locating means;

first and second elongated pressure applying members mounted i juxtaposed relationship to define an elongated pressure generating gap extending normal to said line of said apparatus and positioned to receive the leading edge of the film unit as the film unit is advanced leading edge first from its exposure position with the exposure area defining edges of the binders facing said first pressure applying member, said pressure applying member serving to apply a compressive force to the film unit effecting first the release of the processing fluid from its container and then the spreading of the released processing fluid between the superposed sheet elements of the film unit as the film unit is advanced through said pressure generating gap; and

means for advancing the film unit leading edge first away from its said exposure position and into said pressure generating gap, said advancing means including means for engaging the film unit adjacent the trailing edge of one of its longitudinal edges causing the leading edge of the film unit to become canted at a predetermined angle with respect to said line of said apparatus as the film unit moves from its exposure position into said pressure generating gap,

said first pressure applying member including means for presenting a pair of laterally spaced apart shallow recesses of substantially equal width to the film unit as it is advanced therepast, said recesses being spaced apart along said first pressure applying member such that their inward edges are separated by a distance less than the lateral width of the film unit's exposure area, said width of said recesses being selected such that their outward edges are separated by a distance less than the width of the film unit, said recesses further being arranged laterally along said first pressure applying member to be asymmetrically disposed with respect to said line of said apparatus to respectively progressively receive the entire length of the exposure area defining edges of the binders as the film unit moves through said pressure generating gap while portions of the film unit binders overlying both sides of the longitudinal edge portions of the film unit's juxtaposed sheet elements being continually disposed between said pressure applying members exteriorly of said recesses at such times and thereby function in combination with the longitudinal edges of the superposed film unit sheets respectively disposed therebetween to space said pressure applying members away from one another as the film unit moves through said pressure generating gap with the processing fluid, as it is released from its container, spreading between th film unit's superposed sheets underneath and laterally beyond the exposure area defining edges of the binding.

4,020,499

APPARATUS FOR CONTROLLING DRIVE TO PRESSURE ROLLERS IN A CAMERA WITH ELECTRIC MOTOR DRIVE

Clifford G. Vroom, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

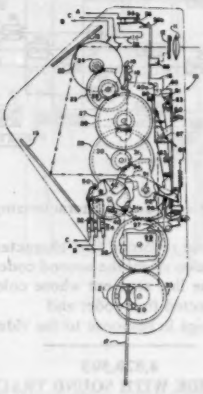
Filed Mar. 1, 1976, Ser. No. 662,307

Int. Cl.² G03B *17/50*

U.S. Cl. 354—86 **5 Claims**

1. In a camera for effecting exposure and processing of a self-processable film unit, the camera including a shutter for exposing the film unit, a movable shutter release member for actuating the shutter, means for restoring the shutter release member to an initial position after movement of the member to actuate the shutter, a pair of opposed pressure members at least one of which is a roller for removing the exposed film unit from the camera, an electric motor, drive means coupling the motor to the roller for drivingly rotating the roller, and control means for controlling electric current to the motor, the improvement wherein the control means comprises:

a star wheel;
means for rotatively supporting the star wheel;
means for rotating the star wheel incrementally through a cycle, the star wheel rotating means also being coupled with the drive means so that one complete revolution of the star wheel is associated with a desired number of rotations of the roller;
means cooperating with the star wheel for selectively furnishing electric current to the motor in accordance with the angular orientation of the star wheel; and



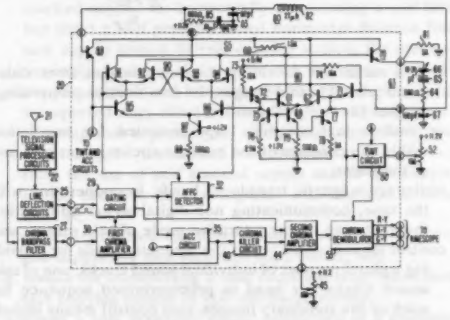
means for mechanically nudging the star wheel from an end-of-cycle position in which position no electric current is furnished to the motor to an angular orientation in which electric current may be furnished to the motor, the nudging means being cooperable with the shutter release member so as to nudge the star wheel from its end-of-cycle position during return of the shutter release member to its initial position.

4,020,500

CONTROLLED OSCILLATOR

Leopold Albert Harwood, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,462
Int. Cl.² H04N 9/46
U.S. Cl. 358—19 **15 Claims**



1. A controllable oscillator comprising:
amplifier means having an input and an output;
reactive means having a predetermined resonant frequency response coupled in a closed circuit loop between said input and output of said amplifier means for providing regenerative feedback of sufficient magnitude to produce an oscillatory signal having a reference phase at said output;
means coupled to said output for phase shifting said oscillatory signal a predetermined amount in relation to said reference phase to produce a phase shifted signal;
means for providing control signals representative of the phase and/or frequency of said oscillatory signal with respect to a predetermined reference signal;
control means coupled to said phase shifting means for receiving said phase shifted signal to produce anti-phase signal outputs and responsive to said control signals for providing controllable amounts of said anti-phase output signals;
means for combining said controllable amounts of said anti-phase output signals from said control means with said oscillatory reference signal to produce a combined signal having a resultant phase; and
means for supplying said combined signal to said amplifier means for maintaining said oscillatory signal in desired relation with said predetermined reference signal.

14. In a color television receiver adapted to receive and process a color television signal including a chrominance information component and a color synchronizing burst component having a prescribed phase and frequency, a controlled oscillator comprising:
an oscillation amplifier with an input and an ouput;
a reactive filter network, including a crystal, having a frequency response characteristic centered relatively about said frequency of said burst component, coupled in a closed loop between said input and output of said oscillation amplifier for providing regenerative feedback of sufficient magnitude to produce an oscillatory signal with a frequency substantially equal to said burst component frequency and with a reference phase;
a phase shift network coupled to said output for phase shifting said oscillatory signal and a predetermined amount with respect to said reference phase to produce a phase shifted signal;
a source of control signals representative of the frequency and/or phase of said oscillatory signal with respect to said burst component;
a controllable amplifier supplied with said phase shifted signal to produce anti-phase signal outputs and responsive to said control signals for providing controllable amounts of said anti-phase ouput signals in accordance with the magnitude and polarity of said control signals;
a combining network coupled to said oscillation amplifier and to said controllable amplifier for summing said oscillatory signal and said controllable amounts of said anti-phase output signals to produce a combined signal having a resultant phase; and
means for coupling said combined signal to said reactive filter network to proudce an oscillatory signal in desired frequency and phase synchronism with said burst component.

4,020,501

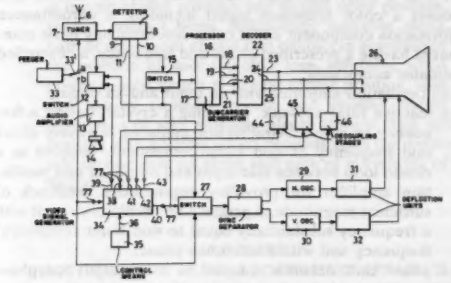
APPARATUS FOR VISUALIZING ON A KINESCOPE SCREEN VIDEO SIGNALS WHICH ARE EITHER PICKED UP BY AN ANTENNA OR GENERATED IN THE APPARATUS ITSELF

Horst Hillberger; Dino Masili; Lorenzo Plos, all of Pordenone, and Luigi Ret, Porcia (PN), all of Italy, assignors to Industrie A. Zanussi S.p.A., Pordenone, Italy

Filed Feb. 18, 1976, Ser. No. 658,899
Claims priority, application Italy, Feb. 27, 1975, 45701/75
Int. Cl.² H04N 9/535; G08B 23/00
U.S. Cl. 358—64 **7 Claims**

1. An apparatus for the visualization on a kinescope screen of color video signals alternatively picked up by an antenna and generated in the same apparatus, comprising an audio and video receiving circuit having, in a conventional manner, a

feeding stage, a tuning stage and a detecting stage at medium frequency for the composite antenna signal, said detector having a first output adapted to drive the audio section of said circuit, a second output adapted to drive said kinescope through a section incorporating a generator of a fixed frequency signal, for processing said composite signal chromatically, and a third output adapted to drive the kinescope deflection system through a synchronism separator stage, characterized in that it comprises, additionally, a device for generating, in a manner known per se, additional composite color video signals which are controllable and representative of respective luminous symbols to be visualized on said kinescope, said device having a main input driven by said generator, at least a control input driven by control means, known per se, for said additional signals, a first output for line and picture synchronism signals adapted to drive said synchronism separator, three further outputs for the chrominance components of said additional signals adapted to drive said kinescope though respective decoupling stages, and a fourth output for an audio signal adapted to drive said audio section, the input



of the latter section being alternatively connected to the first output of said detector and to said fifth output through first bistable switching means known per se, the input of said chromatic processing section being alternatively connected to the second output of said detector and to a point at a fixed reference potential through second bistable switching means, the input of said synchronism separator being alternatively driven by the third output of said detector or by the first output of said device through third bistable switching means, and further characterized in that the output of said feeder, through a manually actuable switch, alternatively feeds either said tuner or said device and third switching means when said switch is in a first and a second position, respectively, the first output of said device being further adapted to drive the switching of said first and second switching means, all of these switches being in a first stable state in which the apparatus processes the signal picked up by the antenna, or in a second stable state in which the apparatus processes the signals generated by said device when said switch is in said first or said second position, respectively.

4,020,502

METHOD AND APPARATUS FOR SEPARATING, COMBINING AND REARRANGING COLORED IMAGES

Heijiro Hayami; Hiroaki Kotera; Hiroyoshi Tsuchiya; Ryuzo Kan; Kunio Yoshida; Tsutomu Shibata, and Yukifumi Tsuda, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Oct. 10, 1975, Ser. No. 621,533

Claims priority, application Japan, Oct. 14, 1974, 49-119101

Int. Cl.² H04N *9/10;* **G03F** *3/00*

U.S. Cl. 358—80 **7 Claims**

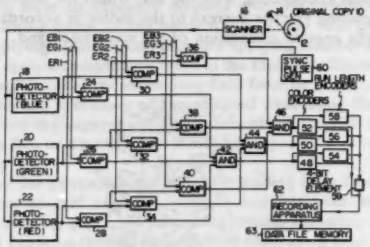
7. A method for separating a colored original into a plurality of colored images and recovering the colored original from the separated images, comprising:

segmenting a colored original into a plurality of line paths;

dividing each of the line paths into one or more line segments of different colors;

characterizing the color of each line segment with a first code;

characterizing the length of each line segment with a second code;



recording the first and second characterizing codes in succession;

detecting one of the recorded first characterizing codes;

decoding into a video signal the second code characterizing the length of the line segment whose color is characterized by the detected first code; and

developing an image in response to the video signal.

4,020,503

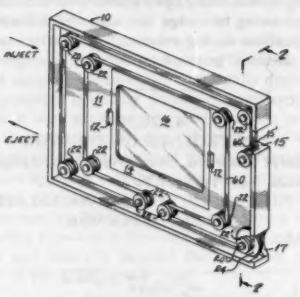
STILL IMAGE SLIDE WITH SOUND TRACK CONTROL

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Filed Mar. 26, 1976, Ser. No. 671,016

Int. Cl.² G11B *23/44*

U.S. Cl. 360—1 **11 Claims**



1. In a means for providing stationary images from slides and sound related to said images, the combination comprising:

a retainer for one of the slides;

an endless taut magnetic tape mounted for translation within the confines of the retainer circumjacent said one of the slides;

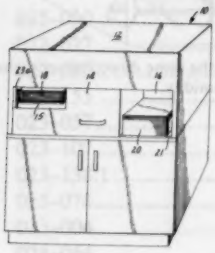
stationary magnetic transducer heads, in cooperation with the tape, communicating non-digital signal information therebetween during operative mode of said means; and

control means connected to the magnetic heads for providing a plural number of individual sound tracks, one of said sound tracks per head in predetermined sequence for each of the stationary images, said control means including first means for enabling each of the sound tracks to have a predetermined time duration and second means for activating each of said heads for a period substantially equal to said predetermined time duration, said first and second means enabling the non-digital signal information to be continued from one of said sound tracks to another.

4,020,504
AUTOMATIC MAGNETIC RECORD SHEET COPYING APPARATUS

Arthur Z. Proulx, Birchwood Village, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 24, 1975, Ser. No. 561,611
Int. Cl.² G11B 25/04, 5/80
U.S. Cl. 360—17 7 Claims



1. A magnetic record sheet copying apparatus comprising

a. a copying station including a magnetically permeable top surface having a plurality of alignment pins projecting therefrom for receiving and aligning a master sheet having a master magnetic record thereon and a blank magnetic copy sheet, said sheets having a plurality of openings positioned to match the location of said alignment pins such that said recieved sheets are precisely aligned,

b. means for pressing together said aligned master and copy sheets, and

c. means for impressing a magnetic field on said pressed together sheets to enhance the bulk duplication of the master magnetic record onto a thus recorded copy sheet,

wherein the improvement comprises

d. a supply station including means for receiving, aligning and supporting a stacked supply of blank copy sheets a predetermined horizontal distance from said copying station,

e. means for precisely vertically lifting a top sheet from said stacked supply, for horizontally transporting a said lifted top sheet a said predetermined horizontal distance from said supply station to said copying station, for precisely vertically lowering the transported top sheet onto said copying station and for engaging the openings in a said transported copy sheet with said alignment pins, thereby ensuring that a plurality of said blank copy sheets may repeatedly be transferred said predetermined distance from the top of said stacked supply and to the copying station precisely aligned together with the master sheet thereat,

f. a discharge station including means for receiving, stacking and supporting said recorded copy sheets, and

g. means for transporting a said recorded copy sheet from said copying station to said discharge station,

whereby a said magnetic record positioned at a predetermined location on a said master sheet may be automatically bulk duplicated onto precisely the same relative location on a plurality of copy sheets by repeated transporting, aligning and pressing together of the respective copy sheets and a said master sheet in the presence of said magnetic field.

4,020,505
MAGNETIC SHEET PLAYER WITH AN ADJUSTABLE INCLINED MAGNETIC HEAD

Masao Iwaoka; Yosuke Igeta; Toyochika Kiku; Fumio Kobayashi, and Tatsuhiko Sugai, all of Tokyo, Japan, assignors to Gakken Co. Ltd., Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,128
Claims priority, application Japan, Nov. 26, 1974, 49-142333; Dec. 11, 1974, 49-149199; Feb. 22, 1975, 50-24817; Feb. 25, 1975, 50-25679; Feb. 27, 1975, 50-26746
Int. Cl.² G11B 21/02, 21/18
U.S. Cl. 360—101 14 Claims

1. In a magnetic sheet player of the type having a casing with a rectangular platform for supporting a magnetic sheet thereon, said magnetic sheet having a spiral magnetic track on one surface which faces said platform, a turntable constituting a part of said platform and rotatable relative to the same, and a magnetic head movable along a radial guide slot in said turntable in step with the rotation thereof to follow the spiral track on the magnetic sheet, the improvement comprising:

a rectangular holder frame means for immovable holding the magnetic sheet over said platform, with the magnetic sheet being caught only at its marginal edges by said holder frame;

means for yieldably urging said magnetic head into abutting contact with the magnetic sheet held by said holder frame over said platform; and

means for holding said magnetic head out of the perpendicular to the plane of the magnetic sheet so that said magnetic head is inclined in the forward direction of rotation of said turntable with respect to the plane normal to the plane of said turntable;

whereby said magnetic head maintains intimate contact with the magnetic sheet throughout its travel along the spiral track thereon.

4,020,506
TAPE CARTRIDGE WITH TRACK POSITION INDICATOR

Michael Conan Barrett, and Eric Sigfried Petterson, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1975, Ser. No. 591,793
Int. Cl.² G11B 21/10, 23/38
U.S. Cl. 360—137 5 Claims

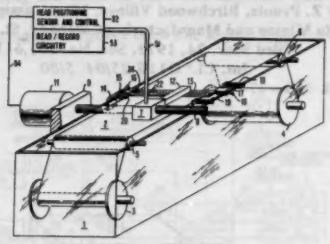
1. A magnetic tape cartridge comprising:

a magnetic tape;

a housing enclosing a portion of said tape and supporting said tape for movement therein;

one end of a track position indicator attached to said housing, said indicator including indicia thereon indicative of track positions of magnetic recording tracks extending longitudinally along said tape and positioned in substantially parallel relation across a width of said tape, said indicator having a coefficient of thermal and hygroscopic expansion closely similar to the coefficient of thermal and hygroscopic expansion of said magnetic tape; and

a reference edge surface contacting one edge of said tape, said reference edge surface attached to said housing of said cartridge and said reference edge surface being perpendicular to said tape, the other edge of said tape being spring biased toward said reference edge surface and exapandable away from said reference edge surface due to temperature and humidity, said indicator being attached to said housing at said reference edge surface, said tape and said indicator expanding substantially the same



amounts in the same direction upon changes in temperature and humidity.

DESIGN PATENTS

GRANTED APRIL 26, 1977

ERRATA

For CLASS	See PATENT NO.
015–090	244,131
022–027	244,132
022–030	244,133
023–155	244,134
023–057	244,135
023–107	244,136
023–138.1	244,137
025–078	244,138
013–004	244,143
024–064	244,152
024–029	244,153
024–023	244,154
024–017	244,155

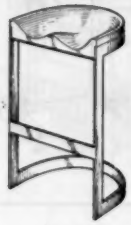
DESIGNS

APRIL 26, 1977

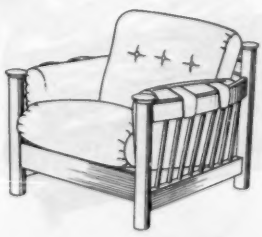
244,106
CHILD'S ROCKING CHAIR
Jeff London, 180 Thimble Islands Road, Stony Creek, Conn. 06405
Filed Sept. 19, 1975, Ser. No. 614,974
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—11

244,107
BAR STOOL
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,122
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—32

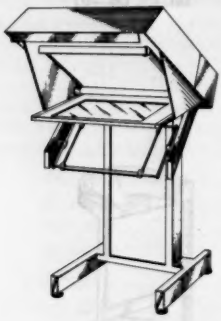
244,108
BAR STOOL
Warren F. Bacon, 1980 Sierra Madre Villa, Pasadena, Calif. 91107
Filed Dec. 16, 1975, Ser. No. 641,303
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—32



244,109
SEAT
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,245
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—73

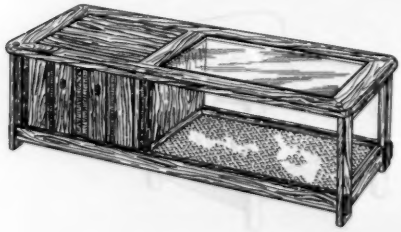


244,110
ELECTRONIC COMPONENT PRODUCTION ASSEMBLY LOCATER
Lewis A. Latanzi, Bethel, Conn., assignor to Contact Systems, Inc., Danbury, Conn.
Filed Sept. 10, 1975, Ser. No. 611,915
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85

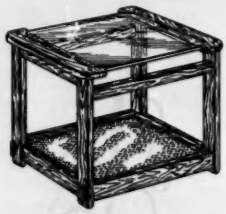


244,111
COMMODE OR SIMILAR ARTICLE
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Jan. 21, 1976, Ser. No. 651,155
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—167

244,112
COCKTAIL TABLE
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Jan. 21, 1976, Ser. No. 650,961
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175

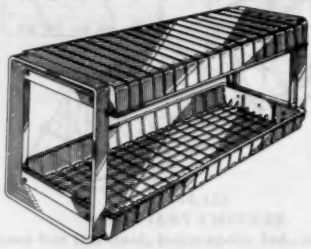


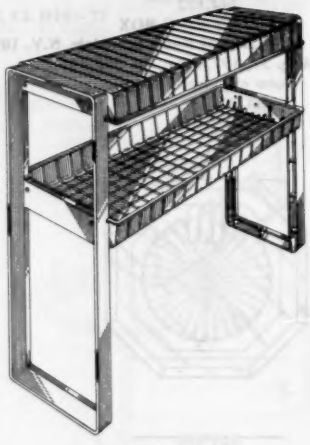
244,113
TABLE OR THE LIKE
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Jan. 21, 1976, Ser. No. 651,154
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



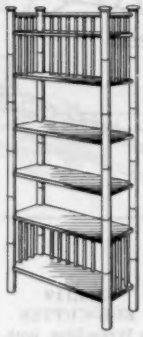
244,114
TABLE
Paul J. Neff, Mississauga, Canada, assignor to Neff Kitchen Manufacturers Limited, Brampton, Canada
Filed July 18, 1975, Ser. No. 597,251
Claims priority, application Canada, June 12, 1975, 1206757
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

244,115
PLANT STAND
Richard D. Dilyard, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed May 10, 1976, Ser. No. 685,084
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—182

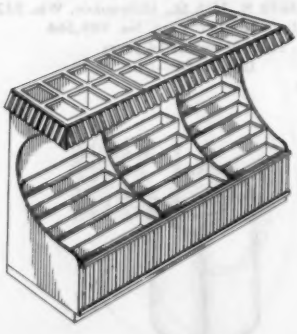




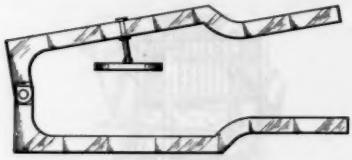
244,116
ETAGERE
Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570
Filed Oct. 20, 1975, Ser. No. 624,841
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186



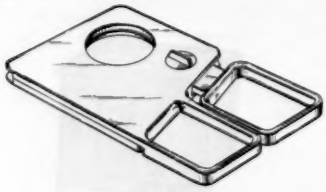
244,117
DISPLAY STAND
Thomas H. Naylor, 1221 W. Lehigh Place, Englewood, Colo. 80110
Filed Jan. 29, 1976, Ser. No. 653,466
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—188



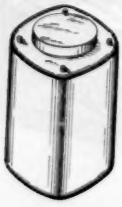
244,118
RETAINING TOOL FOR A CUT CAN LID
Larry G. Dick, 324 Hamilton Drive, Suisun, Calif. 94585
Filed Aug. 13, 1975, Ser. No. 604,233
Term of patent 14 years
Int. Cl. D7—99
U.S. Cl. D7—105



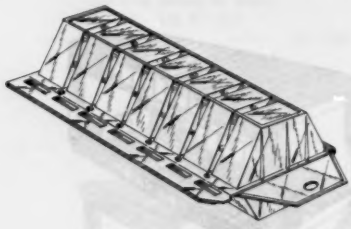
244,119
EGG-CUTTER
Hans Forrer, and Max Wegmüller, both of Lyss, Switzerland, assignors to K. Zysset & Co. AG, Lyss, Switzerland
Filed July 10, 1975, Ser. No. 594,946
Claims priority, application Switzerland, Mar. 14, 1975, 60649/75
Term of patent 14 years
Int. Cl. D7—04
U.S. Cl. D7—106



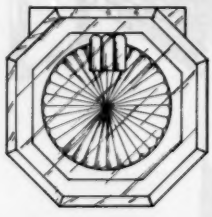
244,120
PACKAGING CONTAINER OR THE LIKE
Julius A. Pieper, 5070 N. 35th St., Milwaukee, Wis. 53209
Filed June 13, 1975, Ser. No. 586,566
Term of patent 14 years
Int. Cl. D9—01
U.S. Cl. D9—168



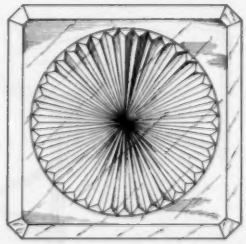
244,121
RIBBON PACKAGE
Richard J. Schwartz, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Sept. 4, 1975, Ser. No. 610,325
Term of patent 14 years
Int. Cl. D9—03
U.S. Cl. D9—183



244,122
JEWELRY RING BOX
Jerome Shiffman, 128 Carthage Road, Scarsdale, N.Y. 10583
Filed Aug. 31, 1973, Ser. No. 393,441
Term of patent 7 years
Int. Cl. D9—03
U.S. Cl. D9—235

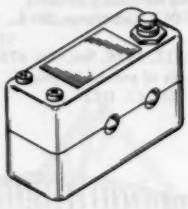


244,123
WATCH BOX
Jerome Shiffman, 128 Carthage Road, Scarsdale, N.Y. 10583
Filed Aug. 31, 1973, Ser. No. 393,442
Term of patent 7 years
Int. Cl. D9—03
U.S. Cl. D9—235



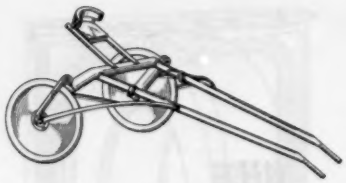
244,124
DIGITAL THERMOMETER
Allan L. McLeod, P.O. Box 18484, Wichita, Kans. 67218
Filed Mar. 3, 1975, Ser. No. 554,410
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57

244,125
BATTERY CHECKER
Johannes Van Den Haak, Indianapolis, Ind., assignor to Curtis Dyna Products Corporation
Filed June 25, 1975, Ser. No. 590,087
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—77

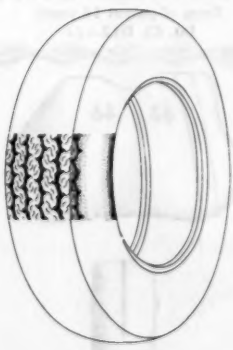


244,126
EARRING SUSPENDABLE NECKLET
Wannas Alfred Ladjimi, 24 Mud Road, Setauket, N.Y. 11785
Filed Aug. 27, 1975, Ser. No. 608,169
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—8

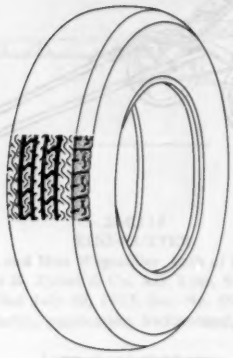
244,127
SULKY
Joseph H. King, Box 1731, Ormond Beach, Fla. 32074
Filed Jan. 23, 1976, Ser. No. 651,867
Term of patent 14 years
Int. Cl. D12—*01*
U.S. Cl. D12—19



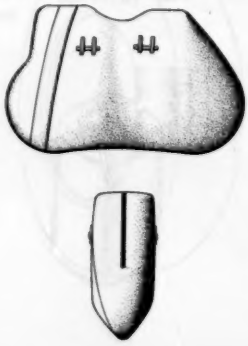
244,128
TIRE
Walter W. Hinkel, Massillon; James J. Martell, Cuyahoga Falls, and Pedro F. Perez, Tallmadge, all of Ohio, assignors to The Goodyear Tire & Rubber Company
Filed Dec. 24, 1975, Ser. No. 644,360
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



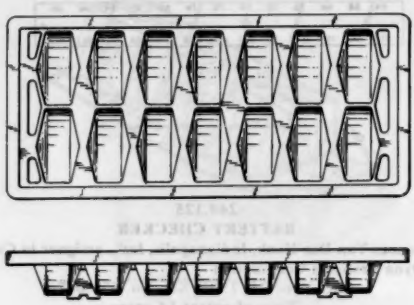
244,129
TIRE
Michael A. Kolowski, Tallmadge, and Charles W. Roberts, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company
Filed June 22, 1976, Ser. No. 698,665
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



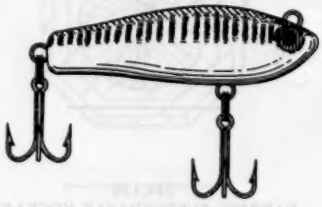
244,130
BICYCLE COVER
Jack R. Blackwell, P.O. Box 1154, Richardson, Tex. 75080
Filed Nov. 7, 1975, Ser. No. 629,717
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—156



244,131
ICE CUBE TRAY
Michael G. Lalonde, 37 Lutsch Ave., No. 5, Leamington, Ontario, Canada
Filed June 23, 1976, Ser. No. 698,939
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—90

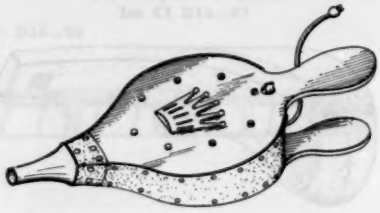


244,132
FISHING LURE
Allen W. Jackson, 1013 Lakemoor Blvd., Rockledge, Fla. 32955
Filed Apr. 12, 1976, Ser. No. 675,986
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



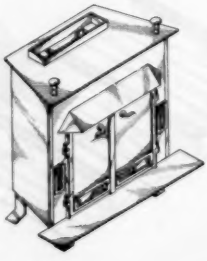
244,133
ORNAMENTAL DESIGN FOR COMBINED FISH HOOK AND ARTIFICIAL FISH EGGS
Thomas N. Tart, 8549 W. Burleigh St., Milwaukee, Wis. 53222
Filed Feb. 9, 1976, Ser. No. 656,610
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—30

244,134
ELECTRIC FAN
Clifford M. Sturgis, 1213 Westmoreland Road, Colorado Springs, Colo. 80907
Filed Sept. 17, 1975, Ser. No. 614,162
Term of patent 14 years
Int. Cl. D23—*04*; D7—*08*
U.S. Cl. D23—155



244,135
PORTABLE SHOWER
Robert L. Barks, Lot 38, Delaware City Trailer Park, Delaware City, Del. 19706
Filed Dec. 10, 1975, Ser. No. 639,382
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—57

244,136
STOVE
Carrol E. Buckner, Weaverville, N.C., assignor to Smoky Mountain Enterprises, Asheville, N.C.
Filed Apr. 9, 1976, Ser. No. 675,413
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—107



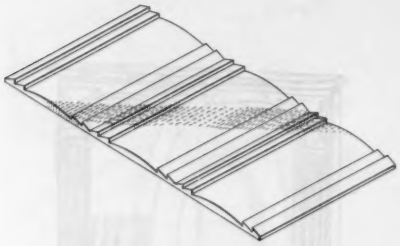
244,137
FIREPLACE MANTEL
Sam Gorman, Chicago, Ill., assignor to Dalton-Gorman Inc., Chicago, Ill.
Filed Jan. 19, 1976, Ser. No. 650,424
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—138.1

244,138
SPINDLE FOR USE IN FORMING ROOM DIVIDERS OR PANELS
Ralph Mondragon, P.O. Box 199, Ranchos de Taos, N. Mex. 87571
Filed Mar. 4, 1975, Ser. No. 555,288
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—78

244,139
CONDENSED MULTIPLE CONVERGENCE LINEAR OPTICAL PLATE FOR INTENSIFICATION OF SOLAR RADIATION OR THE LIKE

Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752

Filed Dec. 1, 1975, Ser. No. 636,778
Term of patent 14 years
Int. Cl. D13—*02;* D26—*05*
U.S. Cl. D13—4



244,140
INTERIOR ACTIVE RECEIVING AUTOMOBILE ANTENNA

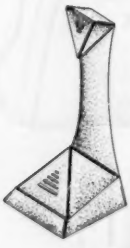
Alexandr Alexeevich Zinichev, 15 Parkovaya ulitsa, 24, korpus 1, kv. 59; Nikolai Alexandrovich Strelkovsky, Nikitinskaya ulitsa, 19/1, kv. 57; Oleg Ulyanovich Melnichuk, Chechersky pereulok, 4, korpus 1, kv. 20, and Vladimir Ivanovich Galkin, ulitsa Marshala Tukhachevskogo, 53, kv. 15, all of Moscow, U.S.S.R.

Filed Mar. 13, 1975, Ser. No. 558,116
Term of patent 14 years
Int. Cl. D14—*03;* D12—*16*
U.S. Cl. D14—86

244,141
TELEPHONE

Robert P. Bliven, 5317 1/2 La Cresta Court, Los Angeles, Calif. 90038

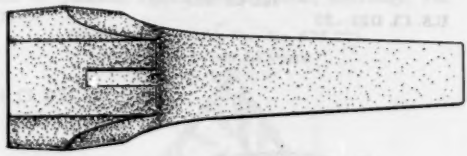
Filed Sept. 16, 1975, Ser. No. 613,759
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



244,142
TELEPHONE

Robert P. Bliven, 5317 1/2 La Cresta Court, Los Angeles, Calif. 90038

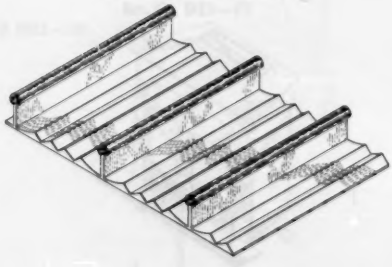
Filed Sept. 18, 1975, Ser. No. 614,487
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



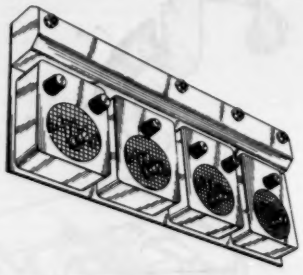
244,143
CONDENSED MULTIPLE CONVERGENCE REFLECTIVE LINEAR OPTICAL AND RECEIVER PLATE FOR SOLAR CONVERSION OR THE LIKE

Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752

Filed Dec. 1, 1975, Ser. No. 636,762
Term of patent 14 years
Int. Cl. D13—*02;* D26—*05*
U.S. Cl. D26—1 R

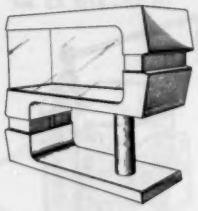


244,144
MODULAR SOUND SYSTEM FOR MUSICAL INSTRUMENTS WITH ELECTRIC PICKUPS
Laurence Anthony Macari, Chorley Wood, England, assignor to Macari's Limited, London, England
Filed Mar. 24, 1976, Ser. No. 669,977
Claims priority, application United Kingdom, Feb. 13, 1976, 974458/76
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96



244,145
TELEPHONE
Robert P. Bliven, 5317½ La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 18, 1975, Ser. No. 614,474
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

244,146
AQUARIUM
Luc Chapleau, 3151 Liebert St., Montreal, Quebec, Canada
Filed June 21, 1976, Ser. No. 698,475
Term of patent 7 years
Int. Cl. D30—*02*
U.S. Cl. D30—8



244,147
AQUARIUM
Steven D. Hall, 10455 Ferguson Road, Dallas, Tex. 75228
Filed Apr. 12, 1976, Ser. No. 675,945
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—9

244,148
AQUARIUM COVER
Daniel F. Groth, 14 Brookdale Drive, Wilbraham, Mass. 01095
Filed Dec. 22, 1975, Ser. No. 642,774
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—12

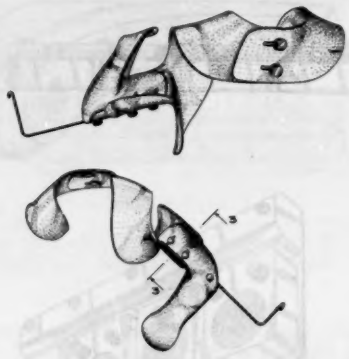
244,149
TENNIS BALL PICKUP
Carl W. Davis, 1182 S. Owens St., Denver, Colo. 80226
Filed Oct. 22, 1975, Ser. No. 624,669
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

244,150
CASH REGISTER
James M. Rittenhouse, Watchung, N.J., assignor to Sweda International, Inc.
Filed July 18, 1975, Ser. No. 597,193
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—4 A

244,151
FONT OF ARABIC CHARACTERS
Ahmed Lakhdar Ghazal, Ave. Moulay Ali Cherif, Rabat, Morocco ((B.P. 430))
Filed June 26, 1975, Ser. No. 590,701
Claims priority, application Morocco, Dec. 28, 1974, 2356
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

ابتثجحخدذرزسشصضطظعغفق
كلمنهويءيىةه

244,152
ABDUCTION SPLINT
Johs. Kvittingen, Moholtlia 30, 7001 Trondheim, Norway
Filed Mar. 12, 1975, Ser. No. 557,865
Claims priority, application Norway, Oct. 21, 1974, 56208
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—64



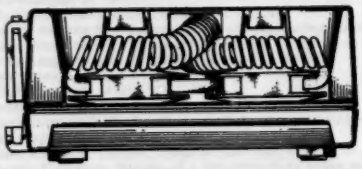
244,153
DEFIBRILLATOR PADDLE ELECTRODE
Paul W. Jones, Bothell, Wash., assignor to Physio-Control Corporation, Redmond, Wash.
Filed Sept. 3, 1976, Ser. No. 720,115
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F

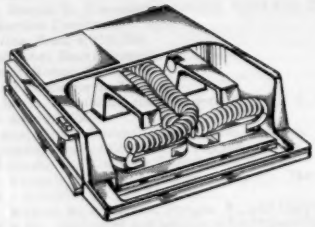
244,154

PORTABLE DEFIBRILLATOR

David B. Smith, Mercer Island; James A. Benson, Bellevue, and Paul W. Jones, Bothell, all of Wash., assignors to Physio-Control Corporation, Redmond, Wash.

Filed Sept. 3, 1976, Ser. No. 720,116
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D83—1 F



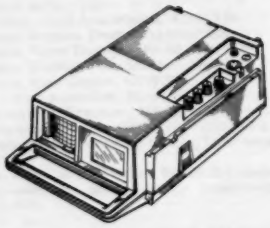


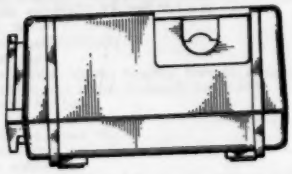
244,155

PORTABLE ELECTROCARDIOGRAM MONITOR AND RECORDER

David B. Smith, Mercer Island, and Douglas J. Hill, Renton, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.

Filed Sept. 3, 1976, Ser. No. 720,118
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D83—1 F





LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF APRIL, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A/S Ardal og Sunndal Verk: *See—*
Natvik, Rolf; and Radahl, Rolf, 4,019,973.

AB Akerlund & Rausing: *See—*
Andersson, Rolf; Bjorklund, Bengt; and Hedberg, Tommy, 4,019,675.

AB Karlstadplattan: *See—*
Eriksson, Erik Gustav Lennart, 4,019,936.

Abarotin, Eugene V.; Buckiso, Michael A.; Farley, Daniel T.; and Simko, Stephen R., to United States Steel Corporation. Rail girder for soaking-pit cover. 4,019,446, Cl. 110-173.00A.

Abbott Screw & Mfg. Co.: *See—*
DeHaitre, Lon, 4,019,550.

Abdallah, Abdulmunien H., to Dow Chemical Company, The. Ethanol intoxication with 2[(3-trifluoromethylphenoxy)methyl]-2-imidazoline. 4,020,167, Cl. 424-273.000.

Abolins, Visvaldis; Cooper, Glenn D.; and Lee, Gim F., Jr., to General Electric Company. Blends of a polyphenylene ether resin, alkenyl aromatic resins modified with EPDM rubber and graft polymerized high rubber content polymers. 4,020,124, Cl. 260-876.00R.

Abraham, Nedumparambil A.; Immer, Hans U.; Nelson, Verner R.; and Sestanj, Kazimir, to Ayerst McKenna and Harrison Ltd. Shortened analogs of somatostatin. 4,020,157, Cl. 424-177.000.

Ackerley, Norman; Mack, Peter Albert; and Johnson, David Harold, to Imperial Chemical Industries Limited. Oxime. 4,020,105, Cl. 260-566.00A.

Ackerley, Norman; and Mack, Peter Albert, to Imperial Chemical Industries Limited. Metal extraction process. 4,020,106, Cl. 260-566.00A.

Ackley, Donald M. Vaporizer apparatus. 4,019,476, Cl. 123-119.0DB.

Acme Service Corporation: *See—*
Levine, Fred, 4,019,704.

Acoustic Fiber Sound Systems, Inc.: *See—*
Croup, Robert E., 4,019,708.

Acumeter Laboratories, Inc.: *See—*
McIntyre, Donald B.; and McIntyre, Frederic S., 4,020,194.

Adachi, Kiyoshi: *See—*
Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, 4,019,228.

Adams, Kenneth Douglas, to Singer Company, The. Feed regulator locks. 4,019,450, Cl. 112-215.000.

Adams, William B.; Anderson, Douglas R.; and Carpenter, Daniel D., to TRW Inc. Method of and apparatus for transmitting and receiving coded digital signals. 4,020,461, Cl. 340-146.1AL.

Addmaster Corporation: *See—*
Busch, Richard E., 4,019,618.

Addressograph Multigraph Corporation: *See—*
Davis, William A., 4,019,435.

Advance Coatings Company: *See—*
Whittum, Howard A.; and Hjelm, Michael J., 4,019,922.

Aebi, Rudolph: *See—*
Vogel, Christian; and Aebi, Rudolph, 4,019,894.

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Aeroport de Paris: *See—*
Bonnard, Pierre Marcel; Bonnet, Pierre; and Duthion, Louis, 4,019,537.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
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Rioux, Christian; and Legentil, Michel, 4,020,412.

Agency of Industrial Science & Technology: *See—*
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, 4,019,982.

Aggarwal, Sundar Lal: *See—*
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,020,115.

Aida, Isao: *See—*
Araki, Mutsuro; Sakai, Bunshiro; Watanabe, Itaru; Yamada, Makoto; Tsukada, Koshiro; Godai, Tomokazu; Aida, Isao; and Nakagaki, Masatoshi, 4,020,312.

Aikoh Co., Ltd.: *See—*
Yoshida, Hiroshi, 4,019,897.

Air Preheater Company, Inc., The: *See—*
Brzytwa, Tadek, 4,019,568.
Regan, John William; and Rode, Douglas Michael, 4,019,465.
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Rumball, Kenneth Francis, 4,020,140.

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Hayashi, Masayuki, 4,019,777.
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Akebono Brake Industry Co., Ltd.: *See—*
Hirai, Hiroshi, 4,019,610.

Akita, Masanori: *See—*
Ogasawara, Masafumi; Akita, Masanori; Saito, Kazuhiko; Kikuchi, Yoshikazu; and Shiokawa, Mitsuhiro, 4,019,844.

Aktiebolaget Bofars: *See—*
Gustafson, Kjell Arne Hakan, 4,020,339.

Aktiebolaget Svenska Electromagneter: *See—*
Carlsson, Hans Thorsten Henrik, 4,019,485.

Aktiebolaget Svenska Flaktfabriken: *See—*
Nystrom, Karl Gustav, 4,019,953.

Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich. Device for treating loose materials. 4,019,688, Cl. 241-39.000.

Akyuerek, Altan, to BBC Brown Boveri & Company Limited. Method for dip-soldering semiconductor components. 4,019,671, Cl. 228-123.000.

Akzo N.V.: *See—*
Boots, Gerardus Anthonius Maria, 4,019,635.

Akzona Incorporated: *See—*
Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, 4,019,326.
Warrick, Ford E., 4,019,312.

Alaimo, Robert J.; and Goldenberg, Marvin M., to Morton-Norwich Products, Inc. 2-Bromo-1-hydroxyquinolizinium bromide substituted anilinium salts. 4,020,075, Cl. 260-296.00B.

Alb. Klein KG: *See—*
Bastgen, Wendel, 4,019,431.

Albrecht, Horst: *See—*
Seiler, Karl; Selke, Martin; Siegling, Oswald; Herzog, Heinz; Albrecht, Horst; and Mohn, Heinrich, 4,019,645.

Albrecht, Leonard N.: *See—*
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Collins, John Desmond; Coates, Harold; and Siddiqui, Iftikhar Hussain, 4,020,090.
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Golightly, David Stainsley; and Onions, Allan, 4,019,916.

Alfter, Franz-Werner; Becke, Joachim; Breitscheidel, Hans-Ulrich; and Laubenberger, Herbert, to Dynamit Nobel Aktiengesellschaft. Interior covering with reinforcement. 4,020,207, Cl. 428-138.000.

Allard, Jules N.; and Gagnon, Victor J., to Bush Universal, Inc. Method and apparatus for lining safety box toes. 4,019,215, Cl. 12-146.00D.

Allen-Bradley Company: *See—*
Wilkerson, Alan W., 4,020,287.

Allen, Henry C.: *See—*
Cuksee, Marjorie T.; and Allen, Henry C., 4,019,933.

Allen, Richard L.; Benjamin, Benny M.; Lappin, Terry A.; Ridgway, John A., Jr.; and Saunders, Elmer J., to Standard Oil Company (Indiana). Apparatus for aerobic fermentation. 4,019,962, Cl. 195-142.000.

Allied Chemical Corporation: *See—*
Marshall, Robert Moore; and Dardoufas, Kimon Constantine, 4,019,990.
Schulze, Stephen R., 4,020,253.

Allis-Chalmers Corporation: *See—*
Jenness, Raymond C., 4,019,787.

Allmendinger, Norbert, to Richmond Industries, Inc. Fire extinguisher. 4,019,584, Cl. 169-74.000.

Allocco, Andrew, Jr., to Farm Stores, Inc. Leak testing device and method for plastic bottles. 4,019,370, Cl. 73-45.100.

Alloway Manufacturing, Inc.: *See—*
Eisenhardt, Fred W., 4,019,755.

Altares, Timothy, Jr., to ARCO Polymers, Inc. Anti-lumping coating for polystyrene beads. 4,020,133, Cl. 264-53.000.

Altenhof, Jack; Altenhof, John; and Chartier, Robert, to J & J Tool and Mold Ltd.; and Consumers Glass Co., Ltd. Mould for closure caps with intermittent threads undercuts or hold-down lugs. 4,019,711, Cl. 249-59.000.

Altenhof, John: *See—*
Altenhof, Jack; Altenhof, John; and Chartier, Robert, 4,019,711.

Alterman, Israel: *See—*
Rom, Josef; Alterman, Israel; and Schwartz, Joseph, 4,019,331.

Alvares, Antonio: *See—*
Biglione, Gianfranco; Alvares, Antonio; and Bertazzoni, Guido, 4,020,022.

Alza Corporation: *See—*
Roth, Nathan, 4,019,633.

Amaria, Pesi Jal; MacLellan, Roy A.; and Tucker, James W., to Canadian Patents and Development Limited. Removal of meat from crustaceans. 4,019,224, Cl. 17-71.000.
American Can Company: *See—*
Rouse, John W., 4,019,452.
American Color & Chemical Corporation: *See—*
Huffman, Allan M., 4,020,053.
American Cyanamid Company: *See—*
Bernstein, Seymour; Joseph, Joseph Peter; and Nair, Vijay, 4,020,160.
Conger, Joseph Clyde, Sr., 4,019,858.
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,020,000.
American Denture Corporation: *See—*
Hazar, Mitchell M., 4,019,253.
American District Telegraph Company: *See—*
Holland, John M., 4,020,477.
American Optical Corporation: *See—*
Coates, Vincent J.; and Welter, Leonard M., 4,020,387.
American Store Equipment Corporation: *See—*
Ernst, Gerhard, 4,019,291.
American Telephone and Telegraph Company: *See—*
Vuotto, Edward Joseph, 4,020,295.
AMF Incorporated: *See—*
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AMP Incorporated: *See—*
Hoffman, Ronald Clarence, 4,019,801.
Osman, Lloyd Carl, 4,019,236.
Shannon, Suel Grant; Timmins, Harold Chester; and Gookin, Kenneth Earl, 4,019,802.
Soes, Lucas, 4,019,800.
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Ampex Corporation: *See—*
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Analog Devices, Inc.: *See—*
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Andersen, Delmar Lloyd; Boston, Louis Russell; and Seleen, William H., to Borden, Inc. Starter culture media containing whey. 4,020,185, Cl. 426-36.000.
Andersen, Finn Schnoor: *See—*
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Anderson, Frederick H.: *See—*
Suh, Nam P.; Malguarnera, Salvatore C.; and Anderson, Frederick H., 4,019,652.
Anderson, Robert T.; Loy, Henry L.; and Nesbit, William J., to General Electric Company. Recombiner apparatus. 4,019,871, Cl. 23-288.00K.
Anderson, Scott K., to Teleplex, Inc. Random access, multiple station communication system. 4,020,289, Cl. 179-15.0FD.
Anderson, Victor O. Casting support for automatic cast trim machines. 4,019,564, Cl. 164-271.000.
Anderson, Warren A.: *See—*
Labadini, William M.; Passmore, Edmund M.; and Anderson, Warren A., 4,020,383.
Anderson, William G. System and cold cabinet server. 4,019,339, Cl. 62-255.000.
Andersson, Rolf; Bjorklund, Bengt; and Hedberg, Tommy, to AB Akerlund & Rausing. Locking container. 4,019,675, Cl. 229-31.00R.
Ando, Yoshiyuki: *See—*
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Anezaki, Syoji: *See—*
Shiraiwa, Toshio; Kobayashi, Sumio; Marukawa, Katsukiyo; and Anezaki, Syoji, 4,019,562.
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Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, 4,019,880.
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Annin, Gordon D., to Boeing Company, The. Method and apparatus for guiding a jet aircraft in a noise-abated post-takeoff climb. 4,019,702, Cl. 244-182.000.
Aoki, Kan: *See—*
Okazaki, Ryoji; Aoki, Kan; and Shinagawa, Tomoyuki, 4,020,242.
Aoki, Kazuteru, to Toshiba Kikai Kabushiki Kaisha. Injection apparatus for die cast machines. 4,019,561, Cl. 164-155.000.
Aonuma, Masashi; and Tamai, Yasuo, to Fuji Photo Film Co., Ltd. Process for producing a magnetic material and magnetic recording medium containing the same. 4,020,236, Cl. 428-457.000.
Aoyama, Ryozo; Matsuda, Yukinobu; and Urushima, Mitsuo, to Kabushiki Kaisha Komatsu Seisakusho. Controls for a hydraulically driven vehicle. 4,019,321, Cl. 60-484.000.
Apotheker A. Herbert K.G., Fabrik Pharmazeutischer Praparate Wiesbaden: *See—*
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Appel, Eggert; Geisler, Gottfried; and Seebode, Albert, to Fischer & Porter Co. Unitized electrode assembly for electromagnetic flowmeter. 4,019,386, Cl. 73-194.0EM.
Appleby, Vernon L. Trash disposal system. 4,019,896, Cl. 75-44.00S.
Appleyard, Francis J.; and Stavrinou, Stavros C., to Armstrong Cork Company. Method of treating waste sheet flooring. 4,020,020, Cl. 260-2.300.
Applied Motors, Inc.: *See—*
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Aquanetics, Inc.: *See—*
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Araki, Mutsuro; Sakai, Bunshiro; Watanabe, Itaru; Yamada, Makoto; Tsukada, Koshiro; Godai, Tomokazu; Aida, Isao; and Nakagaki, Masatoshi, to Nippon Kokan Kabushiki Kaisha; and Kobe Steel Ltd. Method of manufacturing thick, high-strength steel pipe for low temperature service. 4,020,312, Cl. 219-61.000.
Arayama, Takao: *See—*
Matsudo, Kazuo; Shimomura, Takayoshi; Kurokawa, Teruo; and Arayama, Takao, 4,019,929.
Arcamone, Federico; and Cassinelli, Giuseppe, to Societa' Farmaceutici Italia S.p.A. L-lyxohex-1-enopyranose derivative. 4,020,270, Cl. 536-18.000.
ARCO Polymers, Inc.: *See—*
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Ariga, Masahiko: *See—*
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Armas, Eduardo Santana. Building modules and structure embodying such modules. 4,019,293, Cl. 52-79.110.
Armco Steel Corporation: *See—*
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Armstrong Cork Company: *See—*
Appleyard, Francis J.; and Stavrinou, Stavros C., 4,020,020.
Armstrong, William A., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Cathode for hydrazine/air cell. 4,020,239, Cl. 429-42.000.
Arnold, William O., to Union Insulating Company. Electrical wiring box with attached mounting elements. 4,019,647, Cl. 220-3.300.
Arsenault, Joseph A., to Page Belting Company Incorporated. Lug strap. 4,019,542, Cl. 139-153.000.
Artamonoff, Serge: *See—*
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Asai, Kiyokazu; and Takeuchi, Akihiro, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Liquid atomizing apparatus utilizing ultrasonic wave. 4,019,683, Cl. 239-102.000.
Asako, Tsunehiko: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Asako, Tsunehiko; and Yoshioka, Kouichi, 4,020,269.
Asano, Masaharu, to Nissan Motor Co., Ltd. Closed loop air-fuel ratio control system for use with internal combustion engine. 4,019,470, Cl. 123-32.0EE.
Asculai, Samuel Simon; Kupferberg, Alfred B., deceased; by Kupferberg, Beatrice, coexecutrix; and by Halpern, Meyer, coexecutor, to Ortho Pharmaceutical Corporation. Nonionic surface active antiherpes simplex viral agents. 4,020,183, Cl. 424-341.000.
ASEA Aktiebolag: *See—*
Bergman, Kjell; and Carlsson, Lars, 4,019,563.
Ashley, Albert H., to GTE Sylvania Incorporated. Drive circuitry with error detection and compensating threshold arrangement. 4,020,293, Cl. 179-18.0GF.
Ashmead, Albert Sidney: *See—*
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Atlantic Richfield Company: *See—*
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Atomic Energy of Canada Limited: *See—*
Feraday, Melville A., 4,020,131.
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Austrailian Atomic Energy Commission: *See—*
Church, Victor Eric; Fraser, Herbert James; and Matthews, Ralph William, 4,020,329.
Auto Gard, Inc.: *See—*
Kirsch, Norton M., 4,020,338.
Autrey, William L. Mattress construction and method of making. 4,019,451, Cl. 112-262.000.

Ayerst McKenna and Harrison Ltd.: *See—*
Abraham, Nedumparambil A.; Immer, Hans U.; Nelson, Verner R.; and Sestanj, Kazimir, 4,020,157.

Aylward, Paul T., to Bethlehem Steel Corporation. Deep hardening machinable aluminum killed high sulfur tool steel. 4,019,930, Cl. 148-36.000.

Aziz, Walid Y.; Ball, Lawrence E.; and Li, George S., to Standard Oil Company. Polymerizates of olefinic nitriles and diene rubbers. 4,020,128, Cl. 260-879.000.

B E Industries: *See—*
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B & J Manufacturing Company: *See—*
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Bae, Hyung Du, to International Telephone and Telegraph Corporation. Densitometer. 4,020,330, Cl. 235-151.300.

Bagby, John P.: *See—*
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.

Baggett, Joseph M., to Dow Chemical Company, The. Process for controlling the molecular weight of aromatic polycarbonates. 4,020,045, Cl. 260-47.0XA.

Bagrov, Georgy Nikolaevich: *See—*
Andrianov, Kuzma Andrianovich; Bagrov, Georgy Nikolaevich; Vasilieva, Tatyana Vsevolodovna; Vasjukov, Vladimir Alexandrovich; Lebedev, Sergei Ivanovich; Makarov, Vladimir Alexandrovich; and Khananashvili, Lotari Mikhailovich, 4,020,226.

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Baker, Elsie Jennie: *See—*
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Baker, Eric Ralph Lloyd, to Baker, Elsie Jennie. Apparatus for cutting poultry carcass. 4,019,223, Cl. 17-11.000.

Baker, John E.: *See—*
Ellis, Delmar H.; Baker, John E.; Shaffernocker, Wayne M.; and Scott, Ralph W., 4,019,375.

Balhorn, Milo G., to Old Fort International, Inc. Block molding machine having a pallet feeder and ejector. 4,019,848, Cl. 425-443.000.

Ball, John Anthony; Warburton, Keith Arthur; and Carew, Raymond Donald, to Ball, John Anthony. Board games. 4,019,740, Cl. 273-131.0KN.

Ball, Lawrence E.: *See—*
Aziz, Walid Y.; Ball, Lawrence E.; and Li, George S., 4,020,128.

Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, to Situno Holding SA. Welding and cutting device for packaging machines. 4,019,307, Cl. 53-182.00R.

Ballestrazzi, Aris: *See—*
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Bambury, Ronald E.: *See—*
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Banko, Anton, to Surgical Design Corporation. Surgical system for controlling the infusion of fluid to and the evacuation of fluid and material from an operating field. 4,019,514, Cl. 128-230.000.

Barbier, Jean; and Cachon, Paul, to Goodyear Tire & Rubber Company, The. Process for the manufacture of hose. 4,019,939, Cl. 156-80.000.

Barger, John Joseph, to Combustion Engineering, Inc. Delivery of welding flux in a method of submerged arc strip cladding of metallic work pieces. 4,020,314, Cl. 219-73.00R.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
Schippers, Heinz, 4,019,311.

Barrett, Charles Jack: *See—*
Dawson, Peter; and Barrett, Charles Jack, 4,019,749.

Barrett, Michael Conan; and Petterson, Eric Sigfried, to International Business Machines Corporation. Tape cartridge with track position indicator. 4,020,506, Cl. 360-137.000.

Bartos, Josef: *See—*
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BASF Aktiengesellschaft: *See—*
Hemmer, Gerd; Hess, Klaus; Becker, Rolf; and Liebhaber, Klaus, 4,019,852.
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Zeitler, Gerhard; and Mueller-Tamm, Heinz, 4,020,025.

BASF Wyandotte Corporation: *See—*
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Bassett, Henry C.; From, Charles A., Jr.; Parker, John F.; and Worley, Ansel A., to Western Electric Company, Inc. Methods of fabricating a connector with a perforable insulative liner. 4,019,250, Cl. 29-629.000.

Bastgen, Wendel, to Aib. Klein KG. Method of dewatering sludge. 4,019,431, Cl. 100-37.000.

Bastings, Petrus Theodorus Cornelis: *See—*
Verhappen, Paulus Jozef Maria; Van Tienen, Antonius Johannes Maria; Feenstra, Johannes; and Bastings, Petrus Theodorus Cornelis, 4,019,888.

Bauer Bros. Co., The: *See—*
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Bauer, Richard A.: *See—*
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Baumgarten, Gerd D., to Heinrich Baumgarten, Eisen- und Blechwarenfabrik. Pan handle. 4,019,221, Cl. 16-114.00A.

Baumgartner, Heinrich, to Siemens Aktiengesellschaft. Circuit arrangement for displacing characters on the screen of a data viewing device. 4,020,483, Cl. 340-324.0AD.

Baxter, William D., to Bunker Ramo Corporation. CRT cursor scan control circuits. 4,020,391, Cl. 315-377.000.

Bayer Aktiengesellschaft: *See—*
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 4,020,178.
Frommer, Werner; Puls, Walter; and Schmidt, Delf, 4,019,960.
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Hocker, Jurgen; and Merten, Rudolf, 4,020,084.
Mayer, Uwe; and Schundehutte, Karl-Heinz, 4,020,063.
Wessling, Diether, 4,020,088.
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BBC Brown Boveri & Company Limited: *See—*
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Beaman, Charles A.: *See—*
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Becke, Joachim: *See—*
Alfter, Franz-Werner; Becke, Joachim; Breitscheidel, Hans-Ulrich; and Laubenberger, Herbert, 4,020,207.

Becker, Rolf: *See—*
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Becker, Werner: *See—*
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Beckman Instruments, Inc.: *See—*
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Beckmann, Jurgen: *See—*
Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, 4,020,032.

Beed (Dishwashers) Limited: *See—*
Hunt, William Joseph, 4,019,689.

Beery, James P., to Bauer Bros. Co., The. Multiple hydrocyclone arrangement. 4,019,980, Cl. 209-211.000.

Begala, Arthur James, Jr.: *See—*
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,020,000.

Beger, Udo; Saillard, Gabriel; and Pasquini, Ari, to Etablissements Morellet-Guerineau GmbH & Co. Handels KG. Foldable pram chassis. 4,019,757, Cl. 280-649.000.

Behar, Isaac; and Genini, Maurice, to Coflexip. Piping apparatus for a floating or semi-submersible platform. 4,019,213, Cl. 9-8.00P.

Behringer, Frederick J.: *See—*
Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., 4,019,390.

Beil, Martin, to Siemens Aktiengesellschaft. Thick-film circuit on a substrate with through-contacts between conductor paths on opposite sides of the substrate. 4,020,206, Cl. 428-137.000.

Belden Corporation: *See—*
Wise, Thomas Q., 4,019,636.

Bell, Allyn Roy: *See—*
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Bell Telephone Laboratories, Incorporated: *See—*
Bonyhard, Peter Istvan; and Smith, James Lanson, 4,020,476.
Coomer, Stephen Dexter, 4,020,459.
Crochiere, Ronald Eldon; and Rabiner, Lawrence Richard, 4,020,332.
Geary, John Michael; and Mattes, Hans George, 4,020,327.
Marcatili, Enrique Alfredo Jose; and Marcuse, Dietrich, 4,019,805.
McKnight, Lee Graves, 4,020,398.

Bellanger, Maurice Georges; and Daguet, Jacques Lucien, to Telecommunications Radioelectriques et Telephoniques T.R.T. System for data transmission through the channels of a frequency division multiplex system. 4,020,288, Cl. 179-15.0FD.

Bendix Corporation, The: *See—*
Bouvier, Alfred Joseph, 4,019,799.
Ritsema, Irving R., 4,019,611.

Benilite Corporation of America: *See—*
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Benjamin, Benny M.: *See—*
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Benjamin, Kenneth A.: *See—*
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Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., to Motorola, Inc. Master slave registers for interface adaptor. 4,020,472, Cl. 340-172.500.

Benson, Lyman David, to Fabtek, Inc. Elevating platform apparatus. 4,019,604, Cl. 182-2.000.

Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., to Procter & Gamble Company, The. Process for preparing a pyrophosphate-silicate detergent product. 4,019,998, Cl. 252-135.000.

Benthos, Inc.: *See—*
Raymond, Samuel O., 4,019,380.

Berglowe, Sven Raymond, Jr.; and Sauer, Earl Salvator, to Western Electric Company, Inc. Manufacturing an insulated conductor and the article produced thereby. 4,020,213, Cl. 428-379.000.

Bergman, Kjell; and Carlsson, Lars, to ASEA Aktiebolag. Method and apparatus for controlling the batching of a melt for pressure tapping furnace. 4,019,563, Cl. 164-155.000.
Berkey, R. Scott. Instant coffee dispenser. 4,019,660, Cl. 222-304.000.
Bernhard, John S., to Xerox Corporation. Coating system having a composite applicator assembly provided with a reciprocating blade. 4,019,816, Cl. 355-3.00P.
Bernstein, Seymour; Joseph, Joseph Peter; and Nair, Vijay, to American Cyanamid Company. Cyclodextrin sulfate salts as complement inhibitors. 4,020,160, Cl. 424-180.000.
Berrange, Aubrey Ralph. Soil compactor. 4,019,825, Cl. 404-133.000.
Bertazzoni, Guido: *See—*
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Bertetto, Donald W.: *See—*
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Berthet, Michel: *See—*
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Bertin & Cie: *See—*
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Bethge, Karin: *See—*
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Bethlehem Steel Corporation: *See—*
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Townsend, Herbert E., Jr.; Horton, James B.; and Woodyatt, Louis R., 4,019,901.
Betz Laboratories, Inc.: *See—*
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Beuchat, Roger, to Mefina S.A. Electric firing device for a pyrotechnic charge. 4,019,439, Cl. 102-70.20R.
Bevan, Geoffrey, to Lever Brothers Company. Detergent compositions. 4,020,015, Cl. 252-544.000.
Beyer, Hermann; Biberbach, Peter; and Scondo, Christian, to Duetsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for nitriding iron and steel in salt baths regenerated with triazine polymers. 4,019,928, Cl. 148-15.500.
Beyerlein, Ludwig: *See—*
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BFG Glassgroup: *See—*
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Bhalla, Sushil K.: *See—*
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Bickley, Robert Henry, to Motorola, Inc. High power radio frequency tunable circuits. 4,020,429, Cl. 333-73.00R.
Bienenfeld, Harold: *See—*
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Bier, Albert: *See—*
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Biernot, Oskar; and Bier, Albert. Wire rod rolling mill. 4,019,360, Cl. 72-249.000.
Bieser, Albert H.; Stuhler, William B.; and Smith, Dorsey T., to B E Industries. Combination gyro and pendulum weight passive antenna platform stabilization system. 4,020,491, Cl. 343-765.000.
Biglione, Gianfranco; Alvares, Antonio; and Bertazzoni, Guido, to Montedison Fibre S.p.A. Process for producing particles of expandable styrene polymers and articles of cellular structure formed from said particles. 4,020,022, Cl. 260-2.5HB.
Binstock, Morton H., to Westinghouse Electric Corporation. Valve sequencing startup control system for once-through boiler. 4,019,467, Cl. 122-406.0ST.
Bio/Physics Systems, Inc.: *See—*
Langner, Rene J., 4,019,721.
Birker, Alfred: *See—*
Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, 4,019,326.
Birkhofer, Hans; Stohr, Arno; and Schrammel, Werner, to Klockner-Werke AG. Control system for injection-molding machine. 4,019,845, Cl. 425-146.000.
Birt, Dennis Courtney Parsons; Holland, Ronald; and Pearce, Leonard John, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defense in Her Britannic Majesty's Government of the. Water activated primary batteries. 4,020,247, Cl. 429-119.000.
Bisceglia, Peter J. Multi colored light signal for vehicles. 4,020,335, Cl. 240-7.10R.
Bishop, Jerald W., to Gilmore-Tatge Manufacturing Co., Inc. Dump truck bed. 4,019,780, Cl. 298-11.000.
Bishop, Walton B., to United States of America, Navy. Sequential observer multi-functional friend accept decider. 4,020,489, Cl. 343-6.5LC.
Bjorklind, Stig Lennart: *See—*
Lejdegard, Sixten Harald; and Bjorklind, Stig Lennart, 4,019,631.
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Black, Christopher Thurson, to Texas Instruments Incorporated. High voltage junction semiconductor device fabrication. 4,019,248, Cl. 29-583.000.
Blackman, Gerald Gordon; and Matthewson, Michael Derek, to Burroughs Wellcome Co. Method of repelling insects from domestic mammals. 4,020,181, Cl. 424-305.000.
Blaschke, Ludwig, to Braun Aktiengesellschaft. Device for use on a film projector for copying films. 4,019,814, Cl. 352-169.000.
Blaw-Knox Food and Chemical Equipment, Inc.: *See—*
Wright, Edward S.; Angstadt, John W.; and Garrow, Gerald L., 4,020,189.
Blessing, Hubert; and Benjamin, Kenneth A., to Ivanhoe Research Corporation. Apparatus for automatically controlling movement of material with respect to a work point in a machine. 4,019,447, Cl. 112-121.110.
Blinov, Ivan Timofeevich: *See—*
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.
Block, James P., to LCOA Laminating Company of America. Method for drilling circuit boards. 4,019,826, Cl. 408-1.00R.
Blodgett, Norman S.: *See—*
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Blount, David H. Process for the polymerization of allyl halides. 4,020,259, Cl. 526-194.000.
BOC Limited: *See—*
Oswald, Roger Derek, 4,020,321.
Bocchino, Vincent T.: *See—*
Murray, Thomas E.; and Bocchino, Vincent T., 4,020,156.
Bochan, John, to General Electric Company. Belt drive mechanism. 4,019,397, Cl. 74-227.000.
Bockstiegel, Georg Heinrich Artur Gerhard, to Hoganas Aktiebolag. Method of producing magnetite article. 4,019,239, Cl. 29-592.000.
Boehringer Mannheim G.m.b.H.: *See—*
Klose, Sigmar; Wahlefeld, August Wilhelm; and Hagen, Alexander, 4,019,961.
Boeing Company, The: *See—*
Annin, Gordon D., 4,019,702.
Christianson, Merrill Andrew; and Hill, Horace Earl, 4,019,827.
Hirt, William J.; and Grotz, Charles A., 4,019,696.
Bohl, Hans-Erich. Apparatus for the cold working of bar stock. 4,019,356, Cl. 72-30.000.
Bohn, Burkhard W.; Evers, Alfred; and Friederichs, Karl-Heinz, to Hagenuk Vormals Neufeldt & Kunke GmbH. Bar feed control arrangement for bar loading magazines. 4,019,411, Cl. 82-2.700.
Bokuda, Yoshiyuki: *See—*
Karasudani, Isao; Takashima, Toshiyuki; and Bokuda, Yoshiyuki, 4,020,217.
Bolt, Barry; and Peters, Petrus, to North American Philips Corporation. Lamp having screw base. 4,020,382, Cl. 313-318.000.
Bolter, Herbert: *See—*
Vogt, Alfred; and Bolter, Herbert, 4,019,679.
Boltswitch, Inc.: *See—*
Erickson, John W.; and Erickson, James A., 4,020,432.
Bolz, Gunner; Deindoerfer, Fred H.; Hu, Chun P.; Kameda, Naomi; and Wang, Robert, to International Diagnostic Technology, Inc. Method for quantitation of antigens or antibodies on a solid surface. 4,020,151, Cl. 424-1.500.
Bonin, Peter J.: *See—*
Crites, Virgil C., 4,019,971.
Bonnard, Pierre Marcel; Bonnet, Pierre; and Duthion, Louis, to Bertin & Cie; and Aeroport de Paris. Arrangement for mounting guide vanes or other transverse objects inside a conduit. 4,019,537, Cl. 138-37.000.
Bonnet, Pierre: *See—*
Bonnard, Pierre Marcel; Bonnet, Pierre; and Duthion, Louis, 4,019,537.
Bonnot, Pierre Edmond Michel. Collapsible shipping container. 4,019,634, Cl. 206-386.000.
Bonyhard, Peter Istvan; and Smith, James Lanson, to Bell Telephone Laboratories, Incorporated. Magnetic bubble memories with nonobstructing crossings between conductor and permalloy patterns. 4,020,476, Cl. 340-174.0TF.
Boots, Gerardus Anthonius Maria, to Akzo N.V. Pallet-container for transporting bulk material. 4,019,635, Cl. 206-386.000.
Borden, Inc.: *See—*
Andersen, Delmar Lloyd; Boston, Louis Russell; and Seleen, William H., 4,020,185.
Messervey, Harry Clifford, 4,019,622.
Borel, Joseph; Lacour, Jacques; and Merckel, Gerard, to Commissariat a l'Energie Atomique. Fabrication of a charge-coupled device. 4,019,247, Cl. 29-578.000.
Borello, Domenic. Electric motor for general purposes. 4,020,370, Cl. 310-37.000.
Borg-Warner Corporation: *See—*
Krueger, Robert Harold, 4,019,992.
Mathews, George P.; and Lech, Thaddeus, Jr., 4,019,612.
Borman, Willem F. H.; and Rock, John A., to General Electric Company. Process for the preparation of polyester compositions having increased melt elasticity. 4,020,122, Cl. 260-835.000.
Boryakov, Viktor Fedorovich: *See—*
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.

Bosico, David F.: *See—*
Bosico, Joseph F.; and Bosico, David F., 4,019,294.

Bosico, Joseph F.; and Bosico, David F., to Bosico Precast Company. Marker support arrangement. 4,019,294, Cl. 52-103.000.

Bosico Precast Company: *See—*
Bosico, Joseph F.; and Bosico, David F., 4,019,294.

Bosniack, David S., to Exxon Research and Engineering Company. Method for removal of gaseous sulfur and nitrogen compounds from gas streams. 4,020,144, Cl. 423-226.000.

Bosniack, David S., to Exxon Research and Engineering Company. Process for the production of sulfur. 4,020,149, Cl. 423-575.000.

Bosserman, David A.; and Freeman, Charles F., to United States of America, Army. Miniature flat panel two microchannel plate picture element array image intensifier tube. 4,020,376, Cl. 313-103.0CM.

Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. 1,4-Dihydropyridine esters used as coronary dilators and anti-hypertensives. 4,020,178, Cl. 424-266.000.

Bosshard, Rene; and Brechbuhler, Hans U., to Ciba-Geigy Corporation. Formylamino-2-triazines. 4,020,066, Cl. 260-249.600.

Bosshard, Rene; and Brechbuhler, Hans U., to Ciba-Geigy Corporation. Triazinyl-amidines. 4,020,067, Cl. 260-249.600.

Boston, Louis Russell: *See—*
Andersen, Delmar Lloyd; Boston, Louis Russell; and Seleen, William H., 4,020,185.

Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., to Hughes Aircraft Company. Reflective liquid crystal light valve with hybrid field effect mode. 4,019,807, Cl. 350-160.0LC.

Boswell, George Albert, Jr.; and Tullock, Charles William, to Du Pont de Nemours, E. I., and Company. Oxidative fluorination of phenols. 4,020,112, Cl. 260-612.00R.

Boswell, Vance F.; and Shoemaker, Robert L., to United States of America, Navy. Underwater vehicle. 4,019,453, Cl. 114-16.00R.

Bourassa, Denis L.: *See—*
Connerney, William R.; and Bourassa, Denis L., 4,020,427.

Bouvaist, Jean Marie Amedee, to Societe de Vente de l'Aluminium Pechiney. Products forged in aluminum alloys with improved mechanical characteristics and a method for obtaining same. 4,019,927, Cl. 148-11.50A.

Bouvier, Alfred Joseph, to Bendix Corporation, The. Electrical connector. 4,019,799, Cl. 339-59.00R.

Bradam, William R., to NCR Corporation. Auxiliary keyboard apparatus. 4,020,328, Cl. 235-146.000.

Brader, Wilbur Thomas: *See—*
Taylor, John Sebring; and Brader, Wilbur Thomas, 4,020,204.

Brahme, Anders Sven, to Scanditronix, Instrument AB. Absorption body. 4,020,356, Cl. 250-510.000.

Brand, Warren H., to Yarway Corporation. Modulating flow control valve. 4,019,527, Cl. 137-115.000.

Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., to Datotek, Inc. Voice security method and system. 4,020,285, Cl. 179-1.50R.

Bratkowski, Walter V.: *See—*
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Braun Aktiengesellschaft: *See—*
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Port, Werner; and Schmieder, Christian, 4,019,252.

Braun, Anton: *See—*
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Brechbuhler, Hans U.: *See—*
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Bosshard, Rene; and Brechbuhler, Hans U., 4,020,067.

Breda, Antoine Georges Leon Jacques, to Produits Chimiques Ugine Kuhlmann. Process for the coloration of hydrophobic chemical fibers by metalliferous dyestuffs of cationic character. 4,019,857, Cl. 8-42.00C.

Bredholt, Olaf: *See—*
McGhie, Russell P.; Bredholt, Olaf; and Rockefeller, Winston G., 4,019,305.

Breglia, Denis R.; Rodemann, Alfred H.; and Long, David T., to United States of America, Navy. Direct fire weapon trainer incorporating hit and data delay responses. 4,019,262, Cl. 35-25.000.

Brehob, Alfred W.; and Wheeler, Carlos E., to Turf Service Laboratories, Inc. Soil moisture indicator device. 4,020,417, Cl. 324-65.00R.

Breitscheidel, Hans-Ulrich: *See—*
Alfter, Franz-Werner; Becke, Joachim; Breitscheidel, Hans-Ulrich; and Laubenberger, Herbert, 4,020,207.

Brendley, William H., Jr.: *See—*
Martorano, Richard; Brendley, William H., Jr.; and Haag, Thomas H., 4,020,219.

Brennan, John F., to UOP Inc. Catalytic composite for treating exhaust gases from an internal combustion engine. 4,020,013, Cl. 252-466.0PT.

Breston, Michael P.: *See—*
Finch, William C., 4,019,576.

Bridger, Floyd R., Jr.: *See—*
Starr, George N.; and Robertson, Boyd C., Jr., 4,019,651.

Briggs, William Scott; and Kjargaard, Niels J., to Georgia-Pacific Corporation. Lignosulfonate composition and process for its preparation. 4,019,995, Cl. 252-62.530.

Brindell, Gordon D.; and Macander, Rudy F., to Quaker Oats Company, The. 4,4'-Methylenebis(2,6-diisobutylphenol). 4,020,113, Cl. 260-619.00A.

Briskin, Theodore S., to Philip Morris Incorporated. Smokable material and method for preparing same. 4,019,521, Cl. 131-2.000.

British Cast Iron Research Association, The: *See—*
Nicholas, Kenneth Ernest Lewis; and Morley, John Glyn, 4,020,027.

British Petroleum Company Limited, The: *See—*
Groszek, Aleksander Jerzy; Parkes, Colin Walter; and Crump, Ronald Alfred, 4,020,200.
Park, Anthony John, 4,020,267.

Brodie, S. Dan. Adjustable headset. 4,020,297, Cl. 179-156.00A.

Brown, Arthur William: *See—*
Murray, Ransom James; and Brown, Arthur William, 4,019,917.

Brown Boveri Sulzer Turbomachinery Ltd.: *See—*
Franklin, Clifford John; and Melliger, Hans, 4,019,831.

Brown, Edgar D., Jr.; and Traver, Frank J., to General Electric Company. Silicone fluid useful as a brae fluid. 4,019,997, Cl. 252-78.300.

Brown & Williamson Tobacco Corporation: *See—*
Strubel, David G.; and Johnson, Robert R., 4,019,520.

Browning, Calvin W., to Garrett Corporation, The. Hydraulically actuated split stirling cycle refrigerator. 4,019,335, Cl. 62-6.000.

Brunswick Corporation: *See—*
Hungerford, Daniel Comstock, 4,019,455.

Brzytwa, Tadek, to Air Preheater Company, Inc., The. Rotor centering device. 4,019,568, Cl. 165-8.000.

Buchalla, Artur, to Hoechst Aktiengesellschaft. Sealing device. 4,019,788, Cl. 308-187.100.

Buckenham, Howard Alfred: *See—*
Gotley, Paul; and Buckenham, Howard Alfred, 4,020,480.

Buckethal, Paul J., to Globe-Union Inc. Material selector system. 4,019,535, Cl. 137-625.150.

Buckiso, Michael A.: *See—*
Abarotin, Eugene V.; Buckiso, Michael A.; Farley, Daniel T.; and Simko, Stephen R., 4,019,446.

Budnick, Edward G., to Plains Chemical Development Co. Chelation. 4,020,091, Cl. 260-429.700.

Bullis, Robert H.: *See—*
Wiegand, Walter J., Jr.; Bullis, Robert H.; and Mongeon, Robert J., 4,019,383.

Bulten-Kanthal Aktiebolag: *See—*
Lejdegard, Sixten Harald; and Bjorklind, Stig Lennart, 4,019,631.

Bunker Ramo Corporation: *See—*
Baxter, William D., 4,020,391.

Bunzer, George J. Wind driven apparatus. 4,019,828, Cl. 415-122.00R.

Burdick, Neal M. Active differential filter network. 4,020,424, Cl. 328-167.000.

Burkard, Edward A.; and Kossuth, Donald A., to National Gypsum Company. Gypsum set accelerator. 4,019,920, Cl. 106-114.000.

Burkhardt, Joseph A.: *See—*
Sinclair, Albert R.; Daughtry, Arthur C.; Childers, Thomas W.; and Burkhardt, Joseph A., 4,019,334.

Burland, Oliver John. Emergency vehicle light. 4,020,047, Cl. 240-46.590.

Burlington AG: *See—*
Schmidt, Walter Richard, 4,019,350.

Burrage, Robert Graham, to Lucas Industries Limited. Apparatus for generating a digital count proportional to an input frequency. 4,020,418, Cl. 324-78.00D.

Burris, William Alan; and Beaman, Charles A. Portable water purifier. 4,019,986, Cl. 210-139.000.

Burroughs Wellcome Co.: *See—*
Blackman, Gerald Gordon; and Matthewson, Michael Derek, 4,020,181.

Burt, Leo E.; and Frazier, Stephen E., to Burt, Leo E. Pesticidal formaldehyde concentrate. 4,020,182, Cl. 424-327.000.

Busby, Edwin Stanley, to Ampex Corporation. Non-linear digital-to-analog converter for servo circuit. 4,020,485, Cl. 340-347.0DA.

Busch, Richard E., to Addmaster Corporation. Reversible ribbon drive mechanism. 4,019,618, Cl. 197-161.000.

Buscher, Richard George; and Carnevale, Peter Eugene, to Lear Siegler, Inc. Weapon delivery system. 4,020,324, Cl. 235-61.50S.

Bush Universal, Inc.: *See—*
Allard, Jules N.; and Gagnon, Victor J., 4,019,215.

Buttman, Rene F.: *See—*
Clement, Gilbert L.; and Buttman, Rene F., 4,020,407.

Butz, Hans: *See—*
Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, Peter; and Weins, Engelbert, 4,019,560.

C.A.V. Limited: *See—*
Lakra, Paul, 4,019,481.
Skinner, Robert Thomas John, 4,019,835.

C. G. Doris: *See—*
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C. L. Frost & Son, Inc.: *See—*
Rosin, Walter M.; VanDerMeulen, Douglas J.; and Frost, Charles C., 4,019,789.

C. P. Hall Company, The: *See—*
Kuceski, Vincent P., 4,020,099.

Cachon, Paul: *See—*
Barbier, Jean; and Cachon, Paul, 4,019,939.

Calini, Anthony J. Construction joint for reinforced concrete structures. 4,020,132, Cl. 264-34.000.

Calistrat, Michael Mircea, to Koppers Company, Inc. Symetrical sealed gear coupling. 4,019,344, Cl. 64-9.00R.

Camillo, Charles Carl, to Illinois Tool Works Inc. Electrical switch for ignition in gas appliances. 4,019,855, Cl. 431-256.000.

Camillo Corvi S.p.A.: *See—*
Mora, Camillo Corvi, 4,020,074.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Armstrong, William A., 4,020,239.
Canada Wire and Cable Limited: *See—*
Dudley, Michael Alan, 4,020,028.
LeRoy, Rodney L.; Grossman, David H.; McDonald, R. Douglas; and Hemmings, David F., 4,020,443.
Canadian General Electric Company Limited: *See—*
Freeman, David Lewis; and Flemons, Ralph Seymour, 4,019,373.
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Canadian Patents and Development Limited: *See—*
Amaria, Pesi Jal; MacLellan, Roy A.; and Tucker, James W., 4,019,224.
Szabo, Ervin I., 4,019,558.
Szabo, Ervin I., 4,019,559.
Cannon, Henry T.; and Taylor, Charlie Edwin, to General Electric Company. Electrolytic capacitor having a silver plated nickel case. 4,020,401, Cl. 361-433.000.
Canon Kabushiki Kaisha: *See—*
Matsumoto, Kazuya, 4,019,817.
Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, 4,020,433.
Caputo, William R.; and Pisatowski, Albert J., to Westinghouse Electric Corporation. Elevator system. 4,019,606, Cl. 187-29.00R.
Carborundum Company, The: *See—*
Sears, Arthur H.; and Siuta, August J., Jr., 4,019,853.
Stoia, John Z.; and Wright, Clarence E., 4,019,445.
Carew, Raymond Donald: *See—*
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Carl Schenck AG: *See—*
Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, 4,020,423.
Keller, Guenter; Klinger, Friedrich; Pohl, Andreas; Schimanski, Gerhard; and Zuber, Guenter, 4,019,378.
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Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.
Carlson, Alden J., to Warwick Electronics Inc. Electrical musical instrument with chord generation. 4,019,417, Cl. 84-1.010.
Carlson, Elmer A.; Raffaelli, Joseph G.; and Gann, Ronald A., to International Telephone and Telegraph Corporation. Direct spark ignition system utilizing gated oscillator. 4,019,854, Cl. 431-80.000.
Carlsson, Hans Thorsten Henrik, to Aktiebolaget Svenska Electromagneter. Flywheel magneto having capacitive ignition system. 4,019,485, Cl. 123-148.00E.
Carlsson, Lars: *See—*
Bergman, Kjell; and Carlsson, Lars, 4,019,563.
Carmet Company: *See—*
Hansen, Lloyd B.; and Smarrella, Eugene R., 4,019,590.
Carmichael, James W., to Haja, Inc. Portable cart-mounted propulsion unit. 4,019,597, Cl. 180-11.000.
Carnevale, Peter Eugene: *See—*
Buscher, Richard George; and Carnevale, Peter Eugene, 4,020,324.
Carney, Homer Charles, to General Atomic Company. Electric power generator. 4,020,368, Cl. 310-4.00R.
Carnine, Elmo. Rearview mirror assembly with rotatable mirrors. 4,019,812, Cl. 350-304.000.
Carpenter, Daniel D.: *See—*
Adams, William B.; Anderson, Douglas R.; and Carpenter, Daniel D., 4,020,461.
Carre, Bernard; Puech, Claude; and Spitz, Erich, to Thomson-Brandt. Data carrier for optical read-out. 4,020,278, Cl. 358-128.000.
Carrier Corporation: *See—*
Cobb, George E., 4,019,566.
Cartmill, George Bowen. Safety apparatus for engines. 4,019,489, Cl. 123-198.00D.
Case Western Reserve University: *See—*
Martin, William O.; and Derda, Harry, 4,019,727.
Casey, Thomas P., to Caterpillar Tractor Co. Tilting means for bulldozer blades. 4,019,588, Cl. 172-804.000.
Cashin Systems Corporation: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,019,286.
Caspari, Fred W.; and Johnson, Wayne C., to Magnavox Company, The. Electronic system for automatically tuning to a selected television channel. 4,020,419, Cl. 325-421.000.
Caspari, Fred W., to Magnavox Company, The. Segmented character generator for use with a television receiver. 4,020,484, Cl. 340-324.0AD.
Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,020,071.
Cassinelli, Giuseppe: *See—*
Arcamone, Federico; and Cassinelli, Giuseppe, 4,020,270.
Castanis, George. Edifice for playing word game. 4,019,743, Cl. 273-135.00D.
Castanis, George: *See—*
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Caterpillar Tractor Co.: *See—*
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Dezelan, Joseph Edward, 4,019,585.
Habiger, Cyril W., 4,019,602.
Herr, Charles H., 4,019,406.
Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., 4,019,600.
Matzelle, Ralph Anthony, 4,019,425.
Meisel, Thomas C., Jr., 4,019,587.
Unruh, Dale H.; and Yates, Jan B., 4,019,603.
Zook, Donald G.; Miller, Kenneth J.; and Patton, Eugene K., 4,019,242.
Zuhn, Arthur A., 4,019,323.
Cauffiel, Ford B. Apparatus for descaling metal strips. 4,019,282, Cl. 51-75.000.
Cavrich, George. Method and apparatus for developing a garment pattern. 4,019,257, Cl. 33-17.00R.
Ceci, Barry L., to Metrosonics, Inc. Signal analysis apparatus for amplitude statistics. 4,020,286, Cl. 179-1.50A.
Cegedur Societe de Transformation de l'Aluminium Pechiney: *See—*
Ohta, Motomu, 4,019,342.
Celanese Corporation: *See—*
Davis, Howard J.; and Thomas, Norman W., 4,020,142.
Dix, Robert; Markel, Richard F.; Parker, James A.; Riggs, John P.; and Vest, Dale T., 4,020,273.
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Wroclawski, Zbigniew; Kedzia, Stanislaw; and Pawlowski, Tadeusz, 4,019,691.
Centre Technique des Industries Mecaniques: *See—*
Wartelle, Claude; and Leveque, Michel, 4,019,379.
Cerone, Frank Ernest, Jr.: *See—*
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Champion International Corporation: *See—*
Hanson, Wallace E., 4,019,692.
Chandroga, Issabhai I., to Raymond Lee Organization, Inc., The, a part interest. Chemical diluting system. 4,019,530, Cl. 137-334.000.
Chaplin, Gervase M.; and Childers, Thomas W., to Exxon Production Research Company. Apparatus and method for externally testing conduit connections. 4,019,371, Cl. 73-46.000.
Charlot, Jean-Claude; and Falconnier, Jean-Claude, to Thomson-CSF. Band-compressor device. 4,020,292, Cl. 179-15.55R.
Charlson, Richard A.: *See—*
O'Connor, Chadwell; and Charlson, Richard A., 4,019,710.
Chartier, Robert: *See—*
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Chase, V. Lindsay, to J. P. Stevens & Co., Inc. Dyeable rubber products. 4,020,135, Cl. 264-78.000.
Chastang, Pelham D., to Monsanto Company. Yarn texturing apparatus. 4,019,229, Cl. 28-1.600.
Chatten, Victor H. Ornamental bubble lamp. 4,020,337, Cl. 240-10.00A.
Chatterjee, Pronoy Kumar, to Personal Products Company. Crosslinked phosphonoalkyl cellulose and absorbent devices incorporating same. 4,020,271, Cl. 536-88.000.
Chemische Werke Huls Aktiengesellschaft: *See—*
Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, 4,020,032.
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Chemplex Company: *See—*
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Chen, Chi-Sin: *See—*
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Chen, James H.; and Huntoon, Lewis W., to Benilite Corporation of America. Beneficiation of ilmenite ore. 4,019,898, Cl. 75-101.00R.
Cherney, Steven D.: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,019,998.
Cherry, Sidney J., to Westinghouse Electric Corporation. Two-material vapor shield for vacuum-type circuit interrupter. 4,020,304, Cl. 200-144.00B.
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Chesner, Jack B. Method of making pizza bread analog. 4,020,184, Cl. 426-19.000.
Chevron Research Company: *See—*
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Chicago Lock Co.: *See—*
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Chicago Pneumatic Tool Company: *See—*
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Childers, Thomas W.: *See—*
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Sinclair, Albert R.; Daughtry, Arthur C.; Childers, Thomas W.; and Burkhardt, Joseph A., 4,019,334.
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Choporis, Peter N.; and Choporis, Robert N. Portable conditioned air breathing device. 4,019,511, Cl. 128-212.000.
Choporis, Robert N.: *See—*
Choporis, Peter N.; and Choporis, Robert N., 4,019,511.

Christianson, Merrill Andrew; and Hill, Horace Earl, to Boeing Company, The. Drill stop. 4,019,827, Cl. 408-202.000.

Christie, George, Jr.: *See—*
Service, Alfred Lewis; and Christie, George, Jr., 4,020,014.

Christmann, Harold F.; and Miklas, Edward J., to Petro-Tex Chemical Corporation. Modified zinc ferrite oxidative dehydrogenation catalysts. 4,020,120, Cl. 260-680.00D.

Christopher, Walter S., to Chicago Lock Co. Keeper lock for a slide fastener. 4,019,353, Cl. 70-68.000.

Christy, Charles A. Positive displacement vane type rotary pump. 4,019,840, Cl. 418-241.000.

Christy, Marcia Elizabeth, to Merck & Co., Inc. 10,11,Dihydro-N-alkoxycarbonyl-10,10,11,11-tetrafluoro-5H-dibenzo[a,d]cycloheptene-5-methylamines. 4,020,096, Cl. 260-471.00C.

Chromalloy American Corporation: *See—*
Kampman, Lester R.; and Hodgson, James H., 4,019,643.

Chrysler Corporation: *See—*
Nuss, Christopher, 4,019,475.

Chubb Integrated Systems Limited: *See—*
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Chuilli, Antonio. Magnetic bingo markers. 4,019,747, Cl. 273-137.0AE.

Church, Victor Eric; Fraser, Herbert James; and Matthews, Ralph William, to Austrailian Atomic Energy Commission. Apparatus for radiation dose measurement. 4,020,329, Cl. 235-151.300.

Churchland, Mark T., to MacMillan Bloedel Limited. Microwave power applicator. 4,020,311, Cl. 219-10.55A.

Ciba-Geigy AG: *See—*
Ridley, Kenneth Arthur, 4,019,906.

Ciba-Geigy Corporation: *See—*
Bosshard, Rene; and Brechbuhler, Hans U., 4,020,066.
Bosshard, Rene; and Brechbuhler, Hans U., 4,020,067.
Ghilardi, Hans Peter; and Atasoy, Kaya, 4,020,162.
Gosteli, Jacques, 4,020,098.
Hiestand, Armin; and Jager, Horst, 4,020,087.
Parkin, Charles Stephen, 4,019,684.
Rathgeb, Paul, 4,020,065.
Vogel, Christian; and Aebi, Rudolph, 4,019,894.

Claflin, Warren E.; and Watson, Francis M., III, to Philip Morris Incorporated. Variable parameter smoking machine. 4,019,366, Cl. 73-23.000.

Clark, Justin S.; and Wallace, Wm. Dean. Method and apparatus for mixing gases. 4,019,523, Cl. 137-7.000.

Clement, Gilbert L.; and Buttman, Rene F., to Etat Francais. Control system for tracking a moving target. 4,020,407, Cl. 318-632.000.

Clements, Thomas W.; and Waters, E. Craig, to Will Ross, Inc. Needle valve assembly. 4,019,534, Cl. 137-614.180.

Clements, William: *See—*
Vork, William D.; and Clements, William, 4,019,395.

Cless, Gerhard; and Kaplan, Edward L., to Extel Corporation. Tape punch machine. 4,019,676, Cl. 234-115.000.

Cluett, Peabody & Co., Inc.: *See—*
Morton, Kenneth O., 4,019,729.

Clyma, Grady L.: *See—*
Lee, Earnest M.; and Clyma, Grady L., 4,019,442.

Coal Industry (Patents) Limited: *See—*
Urquhart, Donald Bremner, 4,019,975.

Coates, Harold: *See—*
Collins, John Desmond; Coates, Harold; and Siddiqui, Iftikhar Hussain, 4,020,090.

Coates, Vincent J.; and Welter, Leonard M., to American Optical Corporation. Field emission electron gun. 4,020,387, Cl. 315-31.00R.

Cobb, George E., to Carrier Corporation. Air conditioning system. 4,019,566, Cl. 165-2.000.

Cochran, Michael J.; and Hamilton, Stephen P., to Texas Instruments Incorporated. Thermal line printer. 4,020,465, Cl. 340-172.500.

Cocker, John Derek; and Sutherland, Derek Ronald, to Glaxo Laboratories Limited. Improvements in or relating to cephalosporin antibiotics. 4,020,058, Cl. 260-243.00C.

Coflexip: *See—*
Behar, Isaac; and Genini, Maurice, 4,019,213.
Hoffmann, Daniel; and Reynard, Remi, 4,019,539.

Cohen, Abraham Bernard; and Roos, Leo, to Du Pont de Nemours, E. I., and Company. Photohardenable vesicular image-forming elements. 4,019,909, Cl. 96-115.00P.

Cohen, Julia Winter, legal representative: *See—*
Winter, Carl E., deceased; and Cohen, Julia Winter, legal representative, 4,019,405.

Cohen, Morton; and Silverman, Elliott. Dental apparatus for cheek retraction and saliva collection. 4,019,255, Cl. 32-33.000.

Colgate-Palmolive Company: *See—*
McGhie, Russell P.; Bredholt, Olaf; and Rockefeller, Winston G., 4,019,305.
Perla, Giulio; Mannara, Giuseppe; and Milesi, Domenico, 4,020,154.

Colgate, Stirling A., to New Mexico Tech Research Foundation, a part interest. Method of mining rock with an electron beam. 4,020,317, Cl. 219-121.0EM.

Collier, David Thomas, to Hawker Siddeley Dynamics Limited. Optical scanning systems with image curvature correcting means. 4,019,804, Cl. 350-7.000.

Collier, Everett J.: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,019,998.

Collin, Andre: *See—*
Walraevens, Rene; and Collin, Andre, 4,020,024.

Collins, John Desmond; Coates, Harold; and Siddiqui, Iftikhar Hussain, to Albright & Wilson Limited. Organotin compounds. 4,020,090, Cl. 260-429.700.

Colombo, Peter: *See—*
Steinberg, Meyer; Colombo, Peter; and Pruzansky, Jacob, 4,020,003.

Combi Co., Ltd.: *See—*
Nakao, Shinroku, 4,019,276.
Nakao, Shinroku, 4,019,751.

Combustion Engineering, Inc.: *See—*
Barger, John Joseph, 4,020,314.
Grubelich, Francis Thomas, 4,019,955.
McAllister, Owen Earl, 4,019,303.
Miles, Bert Benton, 4,019,468.
Smith, Donald Arthur; and Marshall, John Joseph, 4,019,851.

Commissariat a l'Energie Atomique: *See—*
Borel, Joseph; Lacour, Jacques; and Merckel, Gerard, 4,019,247.
Giordano, Fernand; Marmonier, Pierre; and Vayra, Jean, 4,019,954.

Compagnie d'Electronique et de Piezoelectricite C.E.P.E.: *See—*
Helle, Jacques, 4,020,426.

Compagnie Generale de Geophysique: *See—*
Michon, Dominique; and Staron, Philippe, 4,020,447.

Conforti, Frederick J.; and Ogden, Wilbur L., to Pittway Corporation. Fire detector. 4,020,479, Cl. 340-237.00S.

Conger, Joseph Clyde, Sr., to American Cyanamid Company. Concentrated direct dye solution and process therefor. 4,019,858, Cl. 8-85.00R.

Conklin, Hale, to Divajex. Thermal enclosure and method. 4,019,340, Cl. 62-371.000.

Connerney, William R.; and Bourassa, Denis L., to United States of America, Army. Foam matching load. 4,020,427, Cl. 333-22.00R.

Consaul, Kenneth E. Combination shower head and toiletries mixing and dispensing apparatus. 4,019,658, Cl. 222-144.500.

Consumers Glass Co., Ltd.: *See—*
Altenhof, Jack; Altenhof, John; and Chartier, Robert, 4,019,711.

Consupak, Inc.: *See—*
Farrell, John Jerome, 4,019,849.

Continental Can Company, Inc.: *See—*
Down, Alfred G.; and Nebeling, Robert L., 4,019,427.

Continental Group, Inc., The: *See—*
Khoury, Nick S., 4,019,648.

Continental Oil Company: *See—*
Gawel, Len J.; and Chen, Chi-Sin, 4,019,959.

Cook, Martin Christopher; and Laundon, Brian, to Glaxo Laboratories Limited. Antibiotics. 4,020,077, Cl. 260-306.70C.

Cooke, Claude R., to GTE Sylvania Incorporated. Precision automatic tracking system. 4,020,340, Cl. 250-203.00R.

Coomer, Stephen Dexter, to Bell Telephone Laboratories, Incorporated. Parity generation and bus matching arrangement for synchronized duplicated data processing units. 4,020,459, Cl. 340-146.1AG.

Cooper, Glenn D.: *See—*
Abolins, Visvaldis; Cooper, Glenn D.; and Lee, Gim F., Jr., 4,020,124.

Coors Container Company: *See—*
Frenkel, Robert Leland; Vischer, Peter; and Gulka, James Allen, 4,019,620.

Corbett, James Patrick. Oscillating crystal transducer systems. 4,020,448, Cl. 340-8.00S.

Cordi, Vincent Anthony; and Edson, Bruce Adam, to International Business Machines Corporation. Memory hierarchy system with journaling and copy back. 4,020,466, Cl. 340-172.500.

Cornelius, James W.; and Mallon, Robert T., to Eagle-Picher Industries, Inc. Preventing formation of excessive bead of coating material on metal can rims. 4,020,198, Cl. 427-336.000.

Corning Glass Works: *See—*
Dahms, Harald, 4,019,861.
Dahms, Harald, 4,019,862.
Elmer, Thomas H.; and Walters, Helen, 4,019,884.

Cornsweet, Tom N.; and Harrison, Richard A., to Baylor College of Medicine. Optical apparatus for obtaining measurements of portions of the eye. 4,019,813, Cl. 351-14.000.

Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, to Institut Francais du Petrole. Process for hydrogenating highly unsaturated heavy hydrocarbon cuts. 4,019,976, Cl. 208-57.000.

Cota, George R.: *See—*
Wintersdorff, Robert W.; and Cota, George R., 4,019,699.

Cote, Toussaint, to Noranda Mines Limited. Gas seal and silencer for use on tuyere body. 4,019,725, Cl. 266-169.000.

Cottman, Kirkwood S., to Goodyear Tire & Rubber Company, The. Phenolic antioxidants. 4,020,042, Cl. 260-45.85H.

Coulthard, Douglas Currie: *See—*
Dunn, John Robert; and Coulthard, Douglas Currie, 4,020,039.

Coulthurst, Ian James, to Chubb Integrated Systems Limited. Token-control. 4,020,326, Cl. 235-61.70B.

Covey, Rupert A.: *See—*
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 4,020,165.

Cox, Paul R., Jr., to Hercules Incorporated. Multi-cavity filaments. 4,020,229, Cl. 428-372.000.

Coxon, John R. Internal combustion engine. 4,019,324, Cl. 60-624.000.

CPC Engineering Corporation: *See*—
Reid, Robert A., 4,019,830.

Cragoe, Edward J., Jr.; and Bicking, John B., to Merck & Co., Inc. Substituted phenoxy-tridecanoic acids. 4,020,177, Cl. 260-399.000.

Craig, Paul George, to Dresser Industries, Inc. Removable drill bit nozzle. 4,019,593, Cl. 175-340.000.

Creusot-Loire Vallourec: *See*—
Mola, Michel, 4,019,565.

Crites, Virgil C., to Bonin, Peter J. Method of recovering fine gold from ore. 4,019,971, Cl. 204-130.000.

Crochiere, Ronald Eldon; and Rabiner, Lawrence Richard, to Bell Telephone Laboratories, Incorporated. Interpolation-decimation circuit for increasing or decreasing digital sampling frequency. 4,020,332, Cl. 235-152.000.

Croll-Reynolds Company, Inc.: *See*—
Gilbert, William J., Jr., 4,019,870.

Crossan, Irvin D.; and Toporcer, Louis H., to Dow Corning Corporation. Method of increasing the molecular weight of hydroxyl end-blocked polydiorganosiloxanes. 4,020,044, Cl. 260-46.5UA.

Croup, Robert E., to Acoustic Fiber Sound Systems, Inc. Latchable swivel mount for loudspeaker. 4,019,708, Cl. 248-137.000.

Crown Zellerbach Corporation: *See*—
Michaylov, Lubomir, 4,020,215.

Croxall, Derek Francis; Kell, Robert Christopher; and Lambert, Robert, to General Electric Company Limited, The. Crystals and their manufacture. 4,019,950, Cl. 156-623.00R.

CRS Industries, Inc.: *See*—
Norsworthy, Ross W., 4,019,367.

Crull, Stanley W., to Sundstrand Corporation. Synchronous control system. 4,019,596, Cl. 180-6.480.

Crump, Ronald Alfred: *See*—
Groszek, Aleksander Jerzy; Parkes, Colin Walter; and Crump, Ronald Alfred, 4,020,200.

Cruse, Clyde L., Jr.; and Kerschbaum, Arthur P., to Armco Steel Corporation. Apparatus for the direct reduction of iron ores. 4,019,724, Cl. 266-156.000.

Crystal, Richard G., to Xerox Corporation. Planographic printing master. 4,019,437, Cl. 101-466.000.

CTS Corporation: *See*—
Kelver, William L.; Stuckey, Ronald L.; and Rozema, Arthur L., 4,020,445.

Cuksee, Marjorie T.; and Allen, Henry C., to United States of America, Army. Pot life extension of isocyanate cured propellants by aziridine compounds. 4,019,933, Cl. 149-19.400.

Cummings, Richard Daniel, to Daystar Corporation. Collecting solar energy. 4,019,496, Cl. 126-271.000.

Cunningham, Marion L.: *See*—
Frazier, Clive A.; and Cunningham, Marion L., 4,019,495.

Cushman, Robert Holbrook; and Stirner, Kurt R., deceased (by Stirner, Genevieve E., executrix), to Gould Inc. Self-balancing positive displacement casting system. 4,019,670, Cl. 228-45.000.

Cutri, Frank J., deceased; and by Cutri, Louise, administratrix. Pattern transfer machine. 4,019,433, Cl. 101-132.500.

Cutri, Louise, administratrix: *See*—
Cutri, Frank J., deceased; and Cutri, Louise, administratrix, 4,019,433.

Cyphert, Gilbert G., to Chemko Industries, Inc. Carpet soil extractor. 4,019,218, Cl. 15-321.000.

Czaplinski, Thomas V.; and Haney, Thomas Albert, to E. R. Squibb & Sons, Inc. Receptacle for radioactive material. 4,020,355, Cl. 250-506.000.

D. H. Baldwin Company: *See*—
Kimble, Thomas E.; and Gregory, Marion B., 4,019,418.

Daedalus Enterprises, Inc.: *See*—
Kerschbaum, Richard Lynn, 4,020,344.

Daguet, Jacques Lucien: *See*—
Bellanger, Maurice Georges; and Daguet, Jacques Lucien, 4,020,288.

Dahle, Norman A., to Gulf Oil Corporation. 3-Benzyl-2-methylimino-5-phenyl-delta-4-1,3,4-thiadiazolines. 4,020,078, Cl. 260-306.80D.

Dahlquist, Jon G. Electroacoustic transducer. 4,020,296, Cl. 179-115.5PV.

Dahms, Harald, to Corning Glass Works. Method and apparatus for measurement of CO_2 and chloride in body fluids. 4,019,861, Cl. 23-230.00B.

Dahms, Harald, to Corning Glass Works. CO_2 measurement and reagents therefor. 4,019,862, Cl. 23-230.00B.

Dai Nippon Printing Company Limited: *See*—
Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; and Fujii, Hitoshi, 4,019,904.

Daido Seiko Kabushiki Kaisha: *See*—
Hattori, Seiji, 4,019,232.

Daimler-Benz Aktiengesellschaft: *See*—
Neuffer, Klaus, 4,020,457.
Wiegard, Klaus, 4,019,750.

Daimler, Berthold H.: *See*—
Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, 4,019,326.

Dainippon Ink and Chemicals, Incorporated: *See*—
Kattoh, Tsutomu; Kumabe, Junichi; and Hirabayashi, Satoshi, 4,020,040.

Dana Corporation: *See*—
Guenther, William D., 4,019,487.

Dana, Paul Robert, to Milliken Research Corporation. Feeder for coherent particulate material. 4,019,662, Cl. 222-414.000.

d'Andrea, Gilbert: *See*—
Ikelheimer, Gerald S.; and d'Andrea, Gilbert, 4,019,674.

Danfoss A/S: *See*—
Nicolaisen, Holger; Andersen, Finn Schnoor; and Jensen, Jens Peter, 4,020,435.

Dannels, Bobby F., to Hooker Chemicals & Plastics Corporation. Polythioether sealant compositions. 4,020,033, Cl. 260-31.80Z.

Dardoufas, Kimon Constantine: *See*—
Marshall, Robert Moore; and Dardoufas, Kimon Constantine, 4,019,990.

Datotek, Inc.: *See*—
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.

Daughtry, Arthur C.: *See*—
Sinclair, Albert R.; Daughtry, Arthur C.; Childers, Thomas W.; and Burkhardt, Joseph A., 4,019,334.

D'Auria, Rosemarie, to Raymond Lee Organization, Inc., The, a part interest. Eye shield device. 4,019,516, Cl. 128-268.000.

Davies, Robert William; and Wager, Leonard Richard, to Molins Limited. Packing machines. 4,019,413, Cl. 83-88.000.

Davis, Howard J.; and Thomas, Norman W., to Celanese Corporation. Chemical modification of polybenzimidazole semipermeable. 4,020,142, Cl. 264-347.000.

Davis, John Ephraim, Jr., to International Business Machines Corporation. Iterative coordinate data approximation system for photoemissive pixel pattern displays. 4,020,281, Cl. 178-18.000.

Davis, William A., to Addressograph Multigraph Corporation. Sheet inverting. 4,019,435, Cl. 101-232.000.

Davy Powergas Limited: *See*—
Tate, Walter; and Robertson, Thomas, 4,020,359.

Dawson, Peter; and Barrett, Charles Jack, to Taylor Woodrow Construction Limited. Seals. 4,019,749, Cl. 277-58.000.

Day, Robert J.: *See*—
Seo, Eddie T.; Silverman, Herbert P.; and Day, Robert J., 4,020,246.

Dayco Corporation: *See*—
Waugh, Dale L., 4,019,399.

Daystar Corporation: *See*—
Cummings, Richard Daniel, 4,019,496.

Dean, John W., to United States of America, Energy Research and Development Administration. Superconducting cable cooling system by helium gas and a mixture of gas and liquid helium. 4,020,274, Cl. 174-15.00S.

Dean, John W., to United States of America, Energy Research and Development Administration. Superconducting cable cooling system by helium gas at two pressures. 4,020,275, Cl. 174-15.00S.

De Bartolomeis, Francesco: *See*—
Fare, Carlo; and De Bartolomeis, Francesco, 4,019,694.

Decatur Electronics, Inc.: *See*—
Millard, Keith, 4,020,490.

Deere & Company: *See*—
Freiburger, Thomas William, 4,019,717.
Freiburger, Thomas William, 4,019,718.
Fresmann, Karl Heinz; and Herscovici, Saul, 4,019,598.

Deever, William R.: *See*—
Fuller, Matthew H.; and Deever, William R., 4,019,985.

Deffeyes, Robert J.: *See*—
Newton, Gerald S.; and Deffeyes, Robert J., 4,020,227.

DeHaitre, Lon, to Abbott Screw & Mfg. Co. Sealing nut with nylon insert. 4,019,550, Cl. 151-7.000.

Deindoerfer, Fred H.: *See*—
Bolz, Gunner; Deindoerfer, Fred H.; Hu, Chun P.; Kameda, Naomi; and Wang, Robert, 4,020,151.

Deinlein-Kalb, Hans, to AEG-Kanis Turbinenfabrik GmbH. Rapid shutoff extraction check valve. 4,019,713, Cl. 251-28.000.

De Jonge, Albert Klaas: *See*—
Mijnheer, Andries; and De Jonge, Albert Klaas, 4,019,336.

Del Monte Corporation: *See*—
Ross, Edward E., 4,019,547.

Del Medico, Anthony P.: *See*—
Turcotte, Ronald E.; Wolff, Jay R.; Del Medico, Anthony P.; and Lee, Paul C., 4,020,348.

Delta Electronic Control Corporation: *See*—
Suelzle, Larry R.; and Hodges, Leonard O., 4,020,361.

Dempster Industries, Inc.: *See*—
Tangeman, Lawrence N.; and Linsenmeyer, Arthur, 4,019,685.

Deneen, William F. Solids level indicator. 4,019,659, Cl. 222-193.000.

Dennis, Donald A. X-ray inspection device and method. 4,020,346, Cl. 250-358.00R.

De Nora, Vittorio: *See*—
Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, 4,020,235.

Derby, Robert L., to Dow Chemical Company, The. Disposal system. 4,019,628, Cl. 206-524.400.

Derda, Harry: *See*—
Martin, William O.; and Derda, Harry, 4,019,727.

DeRee, Alvia K. Tool for disassembling hydraulic valve lifters. 4,019,237, Cl. 29-213.00E.

Der Estephanian, Estephan; Foreman, Robert E.; Scott, Robert D.; and Friis, Odd, to Research Development Systems, Inc. Wearable, self-contained fully mobile personal breathing apparatus for surgeons and operating room personnel. 4,019,508, Cl. 128-142.700.

Derner, Paul; Sonntag, Hans; and Stehl, Otto, to BFG Glassgroup. Light transmitting panel with sound damping properties. 4,019,295, Cl. 52-171.000.

DeSalvo, Joseph L. Full strength, low density concrete. 4,019,919, Cl. 106-90.000.
Desse, Pierre; and Trezeguet, Jean-Pierre, to Les Cables de Lyon. Centering and fixing means and method for its fabrication. 4,019,538, Cl. 138-108.000.
Deters, Elmer M., to Weil-McLain Co., Inc. Plastic motor-pump base for a submersible pump unit. 4,019,836, Cl. 417-360.000.
Detrick, John Kent, to Du Pont de Nemours, E. I., and Company. Treatment of aromatic amines with gas mixtures derived from the oxidation of ammonia to effect diazotization/coupling. 4,020,052, Cl. 260-140.00R.
Deutsch, Jiri: *See—*
Seidl, Pavel; Rod, Josef; Deutsch, Jiri; and Bartos, Josef, 4,019,310.
Dezelan, Joseph Edward, to Caterpillar Tractor Co. Combined automatic and manual hydraulic control for motor grader blade. 4,019,585, Cl. 172-4.500.
Diamond International Corporation: *See—*
Harvey, Albert J., 4,019,935.
Keen, Everett Morgan; Siciliano, Anthony John; Shah, Kiran Chhabildas; Artamonoff, Serge; and Stigen, Leonard Roy, 4,019,461.
Diamond, Martin J.: *See—*
Freedman, Bernard; and Diamond, Martin J., 4,020,249.
Diamond Shamrock Corporation: *See—*
Germano, Victor V., 4,020,220.
Trocki, Julian Robert, 4,020,103.
Dickson, Arthur D.; and Pruitt, Laurie E., to Minnesota Mining and Manufacturing Company. Electrode construction for flexibie electroluminescent lamp. 4,020,389, Cl. 315-246.000.
Diederich, Gerd: *See—*
Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, Peter; and Weins, Engelbert, 4,019,560.
Diepeveen, John C. Mechanism and method for moving tool or the like. 4,019,668, Cl. 228-3.100.
Diggs, Richard E. Metal building with combined temperature control and firefighting system. 4,019,581, Cl. 169-16.000.
Di Giovanni, Italo. Automatic container-bearer bar for motor vehicles. 4,019,601, Cl. 180-90.000.
Digital Dynamics, Inc.: *See—*
Jerde, James B.; and van Blerk, Victor B., 4,019,533.
Dillon, Oscar W.: *See—*
Spooner, Robert J.; and Dillon, Oscar W., 4,019,286.
Dills, Raymond L., to General Electric Company. Energy saving broiling oven. 4,020,323, Cl. 219-405.000.
DiRocco, Nicholas. No down draft chimney throat. 4,019,491, Cl. 126-120.000.
Dittner, Adam: *See—*
Prenzel, Karl; and Dittner, Adam, 4,019,614.
Dittrich, Ferdinand J.; Durmann, George J.; and Ingham, Herbert S., Jr., to Metco, Inc. Aluminum-coated nickel or cobalt core flame spray materials. 4,019,875, Cl. 428-570.000.
Divajex: *See—*
Conklin, Hale, 4,019,340.
Dix, Robert; Markel, Richard F.; Parker, James A.; Riggs, John P.; and Vest, Dale T., to Celanese Corporation. Vertical pyrolysis furnace for use in the production of carbon fibers. 4,020,273, Cl. 13-7.000.
Dixie-Narco, Inc.: *See—*
Oden, Kenneth W., 4,019,650.
Dixon, Dale D.; and Hayes, Larry J., to Air Products and Chemicals, Inc. Fluorination of polyolefin and polyacrylonitrile fibers. 4,020,223, Cl. 428-224.000.
Dong, Poy; and Fahey, James P. Swing spout faucet. 4,019,536, Cl. 137-625.410.
Dorofix Design Establishment: *See—*
Sadler, Marc, 4,019,267.
Dotschkal, Anton A.; and Massaro, James J. Heating system for building structures. 4,019,677, Cl. 236-9.00A.
Dougherty, Lawrence W., to Zenith Radio Corporation. Method for attaching a shadow or photographic mask to a flangeless, curved faceplate of a color television picture tube. 4,019,231, Cl. 29-25.150.
Dow Chemical Company, The: *See—*
Abdallah, Abdulmunien H., 4,020,167.
Baggett, Joseph M., 4,020,045.
Derby, Robert L., 4,019,628.
Freiter, Edward R., 4,020,034.
Harris, Robert F.; and Tefertiller, Nancy B., 4,020,030.
Jochmann, Ludwig V., 4,019,296.
Mahoney, Robert D.; and Schneider, Stephen E., 4,020,230.
Zweigle, Maurice L.; and Kasley, Samuel J., 4,020,256.
Dow Corning Corporation: *See—*
Crossan, Irvin D.; and Toporcer, Louis H., 4,020,044.
Schroeder, Fred, 4,019,932.
Down, Alfred G.; and Nebeling, Robert L., to Continental Can Company, Inc. Partition assembler. 4,019,427, Cl. 93-37.00R.
Downer, Jason K. Boat cover apparatus. 4,019,212, Cl. 9-1.500.
Downey, Robert Andrew: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,019,887.
Doyle, John R.: *See—*
Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., 4,019,390.
Drackett Company, The: *See—*
Sokol, Charles S., 4,020,016.
Dragerwerk Aktiengesellschaft: *See—*
Oetjen, Georg-Wilhelm; and Warncke, Ernst, 4,019,507.
Drake & Fletcher Limited: *See—*
Smith, Anthony Pawson, 4,019,682.
Dressen, A. Louise: *See—*
Schulz, Wallace W.; and Dressen, A. Louise, 4,020,004.
Dresser Industries, Inc.: *See—*
Craig, Paul George, 4,019,593.
Drimak, Edward George; and Metz, Thomas Arthur, to International Business Machines Corporation. Simultaneous addressing of different locations in a storage unit. 4,020,470, Cl. 340-172.500.
Drone, Gary Alan, to Fiat-Allis Construction Machinery, Inc. Dual pivot axis control lever. 4,019,401, Cl. 74-471.0XY.
Du Pont of Canada Limited: *See—*
Jaswal, Iqbalsingh; and Pugi, Kalev, 4,019,866.
Dubner, Robert B.; and Bienenfeld, Harold. Pressurized tennis ball container. 4,019,629, Cl. 206-315.00B.
DuBois, R. Clark: *See—*
Vijayendran, Bheema R.; and DuBois, R. Clark, 4,019,911.
Ducas, Theodore W., to Massachusetts Institute of Technology. Isotope selective excitation and separation method and apparatus utilizing circularly polarized pulsed radiation. 4,020,350, Cl. 250-423.00P.
Dudley, Michael Alan, to Canada Wire and Cable Limited. Process and bath composition for increasing the rate of polymer deposition in electrocoating. 4,020,028, Cl. 260-18.0EP.
Duetsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Beyer, Hermann; Biberbach, Peter; and Scondo, Christian, 4,019,928.
Duley, Raymond S.: *See—*
Garner, Edward M.; and Duley, Raymond S., 4,020,366.
Dumser, Josef; and Korner, Wilhelm. Thermal distributing unit. 4,019,681, Cl. 237-63.000.
Dunkin, Albert. Rivet making machine. 4,019,432, Cl. 10-13.000.
Dunlop Australia Limited: *See—*
Prince, Eric Victor Donald; Lewis, Kenneth Llewellyn; and Ralph, Leonard John Michael, 4,019,941.
Dunn, John Robert; and Coulthard, Douglas Currie, to Polysar Limited. Vulcanizable elastomeric compositions. 4,020,039, Cl. 260-42.370.
Du Pont de Nemours, E. I., and Company: *See—*
Boswell, George Albert, Jr.; and Tullock, Charles William, 4,020,112.
Cohen, Abraham Bernard; and Roos, Leo, 4,019,909.
Detrick, John Kent, 4,020,052.
Gander, Frederick W.; Hoegger, Erhard F.; and Kane, William P., 4,020,126.
Herkes, Frank Edward, 4,020,051.
Kosak, John R., 4,020,107.
Miller, Lester I., 4,020,216.
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Czaplinski, Thomas V.; and Haney, Thomas Albert, 4,020,355.
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Earl, T. Desmond, to Textron, Inc. Air cushion undercarriage brake system. 4,019,698, Cl. 244-110.00A.
Earley, John J. Emergency temporary door cover. 4,019,557, Cl. 160-354.000.
Earsley, James L.: *See—*
Earsley, Melvin L.; Earsley, Stephen L.; and Earsley, James L., 4,019,790.
Earsley, Melvin L.; Earsley, Stephen L.; and Earsley, James L. Ball separator for ball bearings. 4,019,790, Cl. 308-201.000.
Earsley, Stephen L.: *See—*
Earsley, Melvin L.; Earsley, Stephen L.; and Earsley, James L., 4,019,790.
Eastes, Frank E., to W. R. Grace & Co. Gel composition, heat sealable substrates, and process for heat sealing. 4,020,228, Cl. 428-347.000.
Eastman Kodak Company: *See—*
Hunt, Clayton Edward, Jr.; and Spooner, Donald James, 4,019,732.
Irick, Gether, Jr.; and Kelly, Charles A., 4,020,041.
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Vroom, Clifford G., 4,020,499.
Ebata, Hiroyuki, to Yoshida Kogyo Kabushiki Kaisha. Slide fastener stringers. 4,019,227, Cl. 24-205.16R.
Ebert, Michael: *See*—
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Ebner, Peter R.; and Griffith, Louis E., to Itek Corporation. Self testing phototypesetter flash intensity control system. 4,020,495, Cl. 354-5.000.
Edson, Bruce Adam: *See*—
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Edwards, Alfred Gerald; and Harris, Glyn Islwyn, to Albright & Wilson Limited. Resin compositions. 4,020,035, Cl. 260-38.000.
Edwards, Dalma Therman; and Strickland, Gene. Quickly attachable and detachable tine frame for a tobacco box rack. 4,019,767, Cl. 294-5.500.
Edwards, John L., to Kraftco Corporation. Method for manufacture of Ricotta cheese. 4,020,186, Cl. 426-36.000.
Edwards, Stanley H., Jr.; and Reese, Cleve L., to Square D Company. Cover assembly for an electrical switch. 4,020,308, Cl. 200-310.000.
Edwin Cooper & Company Limited: *See*—
Jayne, Gerald John Joseph; and Askew, Herbert Frank, 4,019,991.
Efroymson, John S.: *See*—
Kornblum, Daniel; and Efroymson, John S., 4,019,515.
EG&G, Inc.: *See*—
Manning, William L., 4,020,379.
Eggert, Glenn J.; and Lee, Phillip L., to Rexnord Inc. Turntable. 4,019,627, Cl. 198-786.000.
Ehmann, William J., to SCM Corporation. Selective hydrogenation of unsaturated compounds. 4,020,108, Cl. 260-586.00P.
Eidelberg, Jonah; Mooney, Thomas; and Bauer, Richard A., to I-T-E Imperial Corporation. Raintight connector for electrical conduit. 4,019,762, Cl. 285-340.000.
Eigenmann, Ludwig. Anti-skid and wear resistant road surface marking material. 4,020,211, Cl. 428-323.000.
Eilberg, Ralph G.: *See*—
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Wooding, William M., 4,020,019.
Eisenhardt, Fred W., to Alloway Manufacturing, Inc. Hitch assembly for mounting a transverse beam on a three-point hitch. 4,019,755, Cl. 280-490.00A.
Elbreder, Charles H. Dental hygiene package. 4,019,522, Cl. 132-90.000.
Elder, James H.; and Patterson, Hubert A., to General Electric Company. Muting circuit. 4,020,421, Cl. 325-478.000.
Electricite de France: *See*—
Gillet, Roger; Berthet, Michel; and Moisson-Franckhauser, Francois, 4,020,371.
El-Gammal, Hussein Mokhtar, to Ferraris Development and Engineering Company Limited. Apparatus for use in the measurement of the flow rate of fluid flow. 4,019,382, Cl. 73-194.00R.
Elitex, koncern textilniho strojirenstvi: *See*—
Seidl, Pavel; Rod, Josef; Deutsch, Jiri; and Bartos, Josef, 4,019,310.
Elitex, Zavody textilniho strojirenstvi generalni reditalstvi: *See*—
Kouklik, Ivo, 4,019,349.
Elkins, Christopher W., to Teledyne Water Pik. Hydrotherapy devices. 4,019,502, Cl. 128-65.000.
Elkus, Eugene S.: *See*—
Pfost, Robert Fred; and Elkus, Eugene S., 4,020,325.
Elliott, Jennings W., to Schlumberger Technology Corporation. Methods and apparatus for recording well logging measurements. 4,020,451, Cl. 340-15.5DS.
Ellis, Delmar H.; Baker, John E.; Shaffernocker, Wayne M.; and Scott, Ralph W., to General Electric Company. Means for inducing vibration in an airfoil. 4,019,375, Cl. 73-71.50R.
Ellis, Franklin Hammond, to Sybron Corporation. Therapeutic method of using low intensity direct current generator with polarity reversal. 4,019,510, Cl. 128-172.100.
Elmer, Frank J., to United States of America, Army. Transparent optical power meter. 4,019,381, Cl. 73-190.0EW.
Elmer, Thomas H.; and Walters, Helen, to Corning Glass Works. Method for providing porous broad-band antireflective surface layers on chemically-durable borosilicate glasses. 4,019,884, Cl. 65-30.00R.
Emelyanov, Viktor Ivanovich; Grois, Khaim Shlemovich; and Kadomsky, Dmitry Evgenievich. Rectifier-inverter system of converter substation. 4,020,410, Cl. 321-11.000.
Emenaker, Leo J., to Printronix, Inc. Paper feed sensing mechanism for printer. 4,019,619, Cl. 197-189.000.
Enami, Kazuyuki: *See*—
Nenno, Soji; and Enami, Kazuyuki, 4,019,925.
Energy Development Associates: *See*—
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Engineering Enterprises, Inc.: *See*—
Fox, Fred K., 4,019,591.
Fox, Fred K., 4,019,592.
Englund, Gosta R.; and Lindelow, Ernst C-G, to Svenska Dataregister AB. Printing device. 4,019,617, Cl. 197-133.00R.
Enomoto, Nizo: *See*—
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.
Environ Mechanical Services Pty. Limited: *See*—
Gangell, David Bruce, 4,019,582.
Envirotech Corporation: *See*—
Hanley, John F., Jr., 4,019,963.
Epley, John M.; Leach, Austin F.; and Frisch, Arnold, to Hearing Evaluation & Acoustic Research, Inc. Apparatus for testing acoustical attenuation of hearing protectors. 4,020,298, Cl. 179-175.000.
Epstein, Louis S. Universal size disposable shoe cover. 4,019,265, Cl. 36-7.10R.
Epstein, Marvin Aaron, to International Telephone and Telegraph Corporation. MSK digital data synchronization detector. 4,020,283, Cl. 178-88.000.
Erickson, James A.: *See*—
Erickson, John W.; and Erickson, James A., 4,020,432.
Erickson, John M.; and Redgate, Theodore, to United States of America, Army. Transient voltage protection circuit for a DC power supply. 4,020,395, Cl. 361-59.000.
Erickson, John W.; and Erickson, James A., to Boltswitch, Inc. Motorized shunt trip switch operator. 4,020,432, Cl. 335-76.000.
Erickson, Raymond C.; and Bambury, Ronald E., to Richardson-Merrell Inc. 7-[α-Amino-ω-(3,4-methylenedioxyphenyl)acylamido]-cephalosporanic acid derivatives. 4,020,060, Cl. 260-243.00C.
Erickson, Wayne K., to Phillips Petroleum Company. Polyolefin fibers useful as fiberfill treated with finishing agent comprising an organopolysiloxane and a surface active softener. 4,020,212, Cl. 428-361.000.
Ericson, Eric Axel; and Kaufhold, Frederick Daniel, to General Electric Company. Drawout apparatus having improved secondary contact mounting provisions. 4,020,301, Cl. 200-50.0AA.
Eriksson, Erik Gustav Lennart, to AB Karlstadplattan. Method for flooring on a closed underlayer. 4,019,936, Cl. 156-71.000.
Ermolaev, Nikolai Evgenievich: *See*—
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.
Ernst, Gerhard, to American Store Equipment Corporation. Wall system. 4,019,291, Cl. 52-36.000.
Eschmann, Peter. Rigid supporting bandage and method for applying same. 4,019,506, Cl. 128-90.000.
Esper, Friedrich; and Bethge, Karin, to Robert Bosch G.m.b.H. Method of manufacturing α-alumina. 4,019,914, Cl. 106-62.000.
Essex International, Inc.: *See*—
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Establissement Public dit "Telediffusion de France": *See*—
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Beger, Udo; Saillard, Gabriel; and Pasquini, Ari, 4,019,757.
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Clement, Gilbert L.; and Buttman, Rene F., 4,020,407.
Etatech, Inc.: *See*—
Grant, Jon H., 4,020,408.
Euler, Reinhold, to Hoechst Aktiengesellschaft. Method of welding mounting members to a wire. 4,020,315, Cl. 219-91.000.
Eull, Marvin J., to Graco Inc. Pressure unloading apparatus for a diaphragm pump. 4,019,837, Cl. 417-386.000.
Evans, Clifford A.: *See*—
Kamin, Arthur; and Evans, Clifford A., 4,019,841.
Evans, Stephen F., to Procter & Gamble Company, The. Apparatus for forming tampon sacks and filling same with aggregate. 4,019,306, Cl. 53-124.00A.
Evans, William Price; and Naik, Appayya Raghunath, to Lever Brothers Company. Hydroxamic betaines. 4,020,100, Cl. 260-501.130.
Evers, Alfred: *See*—
Bohn, Burkhard W.; Evers, Alfred; and Friederichs, Karl-Heinz, 4,019,411.
Evers, William John, to International Flavors & Fragrances Inc. Certain 3-furyl sulfides. 4,020,175, Cl. 260-347.200.
Evg Entwicklungs-u Verwertungsgesellschaft, Firma: *See*—
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 4,019,665.
Extel Corporation: *See*—
Cless, Gerhard; and Kaplan, Edward L., 4,019,676.
Extracorporeal Medical specialities Inc.: *See*—
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Exxon Production Research Company: *See*—
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Sinclair, Albert R.; Daughtry, Arthur C.; Childers, Thomas W.; and Burkhardt, Joseph A., 4,019,334.
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Levesque, Gerard A.; and Saidla, Glen E. W., 4,019,720.
Wisotsky, Max J., 4,019,878.
F. L. Smidth & Co.: *See*—
Hastrup, Niels E., 4,019,546.
Fabbrica Italiana Magneti Marelli, S.p.A.: *See*—
Zoppi, Bruno, 4,019,526.
Fabian, Hans, to Nukem G.m.b.H. Apparatus for the continuous purification of gases contaminated with tritium. 4,019,867, Cl. 23-260.000.
Fabtek, Inc.: *See*—
Benson, Lyman David, 4,019,604.
Facet Enterprises, Inc.: *See*—
Mortensen, Harold Richard, 4,019,393.

Fahey, James P.: *See—*
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Fairchild Camera and Instrument Corporation: *See—*
Winter, Arthur J., 4,020,487.
Falconnier, Jean-Claude: *See—*
Charlot, Jean-Claude; and Falconnier, Jean-Claude, 4,020,292.
Falomo, Lodovico. Machine for conveying a material in web form through treatment tubs. 4,019,667, Cl. 226-171.000.
Farber, Sheldon, to NCR Corporation. Di-vinyl phthalides color formers. 4,020,056, Cl. 260-240.00D.
Farber, Sheldon, to NCR Corporation. Chromogenic furoquinoxalines. 4,020,068, Cl. 260-250.00Q.
Fare, Carlo; and De Bartolomeis, Francesco, to Honeywell Information Systems Italia. Semiautomatic loading of tape transports. 4,019,694, Cl. 242-182.000.
Farley, Daniel T.: *See—*
Abarotin, Eugene V.; Buckiso, Michael A.; Farley, Daniel T.; and Simko, Stephen R., 4,019,446.
Farm Stores, Inc.: *See—*
Allocco, Andrew, Jr., 4,019,370.
Farrar, Ralph C., to Phillips Petroleum Company. Addition of coupling agent during organolithium initiated polymerizations. 4,020,258, Cl. 526-178.000.
Farrell, John Jerome, to Consupak, Inc. Rapid parison cooling in injection blow molding. 4,019,849, Cl. 425-445.000.
Fastener Industries Inc.: *See—*
Schaft, Edwin E.; and Yeager, Kenneth A., 4,020,316.
Fasulkey, Robert H.; and Quidort, Vaughn L., to Westinghouse Electric Corporation. Parallel transistor protection circuit. 4,020,397, Cl. 361-24.000.
Fauss, Glenn C.; and Scribner, Robert J., to Goodyear Tire & Rubber Company, The. Treatment of tire making components. 4,020,354, Cl. 250-492.00B.
Faust, Raimund Josef, to Hoechst Aktiengesellschaft. Photopolymerizable copying compositions containing biuret-based polyfunctional monomers. 4,019,972, Cl. 204-159.150.
Faxen, Per Torsten; and Karlsson, Frans Harry, to Hykon-Patent Aktiebolag. Valve with roller. 4,019,529, Cl. 137-218.000.
Feath, William M.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.
Federal-Mogul Corporation: *See—*
Ladin, Eli M.; and Green, Paul D., 4,019,784.
Feenstra, Johannes: *See—*
Verhappen, Paulus Jozef Maria; Van Tienen, Antonius Johannes Maria; Feenstra, Johannes; and Bastings, Petrus Theodorus Cornelis, 4,019,888.
Felauer, Ethel E.: *See—*
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Feldl, Erich J. Patient monitor. 4,020,482, Cl. 340-279.000.
Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung: *See—*
Ploetz, Theodor, deceased; Hasse, Adelbert, administrator; and Franzen, Volker, 4,019,952.
Fellows, Daniel; Zemon, Stanley; Sturk, Phillip A.; and Stone, Samuel M., to GTE Laboratories Incorporated. Eccentric optical fiber coupler. 4,019,806, Cl. 350-96.00C.
Fenity, Nancy, executrix: *See—*
Hagenbach, Robert J.; and Fenity, Robert D., deceased, 4,019,903.
Fenity, Robert D., deceased: *See—*
Hagenbach, Robert J.; and Fenity, Robert D., deceased, 4,019,903.
Feraday, Melville A., to Atomic Energy of Canada Limited. Preparation of mixed oxide nuclear fuel. 4,020,131, Cl. 264-.500.
Fernsteuergerate, Kurt Oelsch KG: *See—*
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Ferraris Development and Engineering Company Limited: *See—*
El-Gammal, Hussein Mokhtar, 4,019,382.
Ferrell, John O.: *See—*
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Fiat-Allis Construction Machinery, Inc.: *See—*
Drone, Gary Alan, 4,019,401.
Fickel, R. Gene, to Universal Oil Products Company. Method for controlling the reboiler section of a dual reboiler distillation column. 4,019,964, Cl. 203-1.000.
Filion, Arnold J. Screen gripper. 4,019,769, Cl. 294-19.00R.
Finch, William C., to Finch, William C.; and Breston, Michael P., part interest to each. Oil recovery from an oil-water well. 4,019,576, Cl. 166-250.000.
Firm Josef Frohling: *See—*
Frohling, Josef; and Wiedemer, Karl, 4,019,358.
Fischer, Artur. Anchoring device for use in masonry and like structures and having protection against deleterious influences. 4,019,420, Cl. 85-74.000.
Fischer & Porter Co.: *See—*
Appel, Eggert; Geisler, Gottfried; and Seebode, Albert, 4,019,386.
Herzl, Peter J., 4,019,384.
Satori, Toshio, 4,019,369.
Siegel, William A., 4,019,387.
Fischer, Wolfgang; and Linck, Renate, to Merck Patent Gesellschaft mit beschrankter Haftung. Analytical reagent for cyanide. 4,019,860, Cl. 23-230.00R.
Fitch, John L.; and Strubhar, Malcolm K., to Mobil Oil Corporation. Thermal energy production by in situ combustion of coal. 4,019,577, Cl. 166-259.000.
Fitzgerald, Martin Bruce, to Heyer-Schulte Corporation. Compression implant for urinary incontinence. 4,019,499, Cl. 128-1.00R.
Fleck, Raymond N.; and Young, Donald C., to Union Oil Company of California. Stabilizing alkanals. 4,020,109, Cl. 260-601.00R.
Flemons, Ralph Seymour: *See—*
Freeman, David Lewis; and Flemons, Ralph Seymour, 4,019,373.
Fluck, Henry T. Air pressure-actuated double-acting diaphragm pump with means to produce a selected start-up position. 4,019,838, Cl. 417-393.000.
FMC Corporation: *See—*
Garrett, Michael R., 4,019,580.
Leon, Denny; and Stewart, Frederick M., 4,019,752.
Mohr, Richard A.; Bhalla, Sushil K.; and Zeh, Peter H., 4,020,148.
Stock, David K.; and Wech, Robert J., 4,019,947.
Taylor, John Sebring; and Brader, Wilbur Thomas, 4,020,204.
Thuse, Erik, 4,019,579.
Fodor, Lawrence M., to Phillips Petroleum Company. Impact resistant high vinyl polydiene thermosetting compositions containing fibrous sulfur-containing organic polymer. 4,020,054, Cl. 260-23.70M.
Ford Motor Company: *See—*
Gordon, Ronald S.; Sutton, Ralph W.; and Tennenhouse, Gerald J., 4,020,134.
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Foreman, Robert E.: *See—*
Der Estephanian, Estephan; Foreman, Robert E.; Scott, Robert D.; and Friis, Odd, 4,019,508.
Forgensi, Rudolph; and Hagenbach, Robert J., to Xerox Corporation. Apparatus for forming magnetite electrostatographic carriers. 4,019,842, Cl. 425-7.000.
Forkner, John H. Cooked dough having a frozen dessert filling and method therefor. 4,020,188, Cl. 426-95.000.
Forrester, Harry, to United States Mineral Products Company. Apparatus and process for manufacturing insulation board. 4,019,938, Cl. 156-78.000.
Fosroc A.G.: *See—*
Plaisted, Anthony Cecil, 4,019,630.
Foults, Jonathan Asa, to Scovill Manufacturing Company. Fastener attaching machine having means for orienting caps, buttons, and the like. 4,019,666, Cl. 227-119.000.
Fox, Douglas L. Corrosion-resistant encasement for structural members. 4,019,301, Cl. 52-725.000.
Fox, Fred K., to Engineering Enterprises, Inc. Well drilling tool. 4,019,591, Cl. 175-107.000.
Fox, Fred K., to Engineering Enterprises, Inc. By-pass tool. 4,019,592, Cl. 175-234.000.
Fozzard, George B., to Phillips Petroleum Company. Separation of phenol, cyclohexanone, and cyclohexylbenzene containing mixtures employing dialkyl and dicycloalkyl phthalates. 4,019,965, Cl. 203-60.000.
Francis, James Nelson: *See—*
Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, 4,019,879.
Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, 4,019,880.
Franck, Jean-Pierre: *See—*
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, 4,019,976.
Frank, Dudley B.: *See—*
Garabedian, Arthur, 4,019,479.
Frank, Frederick Charles; Keller, Andrew; and Mackley, Malcolm Robert. Oriented crystallization of polymers. 4,020,266, Cl. 528-498.000.
Franklin, Clifford John; and Melliger, Hans, to Brown Boveri Sulzer Turbomachinery Ltd. Cooled rotor blade for a gas turbine. 4,019,831, Cl. 416-97.00R.
Franzen, Volker: *See—*
Ploetz, Theodor, deceased; Hasse, Adelbert, administrator; and Franzen, Volker, 4,019,952.
Fraser, Herbert James: *See—*
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Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e.V.: *See—*
Scheffer, Terry James, 4,019,808.
Frazier, Clive A.; and Cunningham, Marion L. Control system for solar heater. 4,019,495, Cl. 126-271.000.
Frazier, Stephen E.: *See—*
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Frechette, Alphonse A. Powered wheel system. 4,019,396, Cl. 74-63.000.
Frederick, Henry E.: *See—*
Scheier, Donald J.; and Frederick, Henry E., 4,019,222.
Freedman, Bernard; and Diamond, Martin J., to United States of America, Agriculture. Photodegradable polyolefins containing haloalkyl- or halobenzene-sulfonyl halides. 4,020,249, Cl. 526-3.000.
Freedman, Mark B.: *See—*
Remy, David C.; and Freedman, Mark B., 4,020,169.
Freeman, Charles F.: *See—*
Bosserman, David A.; and Freeman, Charles F., 4,020,376.
Freeman, David Lewis; and Flemons, Ralph Seymour, to Canadian General Electric Company Limited. Ultrasonic transducer mounting and coupling assembly. 4,019,373, Cl. 73-71.5US.
Freiburger, Thomas William, to Deere & Company. Winch cable drum mounting and drive connection. 4,019,717, Cl. 254-187.800.

Freiburger, Thomas William, to Deere & Company. Winch constructed specially for easy lubrication thereof. 4,019,718, Cl. 254-187.500.
Freiter, Edward R., to Dow Chemical Company, The. Epoxy resin coating composition. 4,020,034, Cl. 260-32.8EP.
Frenkel, Robert Leland; Vischer, Peter; and Gulka, James Allen, to Coors Container Company. Method and apparatus for separating a palletized array of containers into single file line. 4,019,620, Cl. 198-399.000.
Fresmann, Karl Heinz; and Herscovici, Saul, to Deere & Company. Articulated tractor. 4,019,598, Cl. 180-51.000.
Frey, Gerhard: *See*—
Mahler, Peter; Frey, Gerhard; and Lerch, Gotthard, 4,020,352.
Freytag, Wolfram Gustav: *See*—
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Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Reiter, Norbert, 4,019,873.
Friederichs, Karl-Heinz: *See*—
Bohn, Burkhard W.; Evers, Alfred; and Friederichs, Karl-Heinz, 4,019,411.
Friedman, Harvey S., to Polaroid Corporation. Photographic fluid processing apparatus. 4,020,498, Cl. 354-86.000.
Friedrich Wilhelm Schwing GmbH: *See*—
Schwing, Friedrich, 4,019,839.
Friend, Larry O.; and Lockwood, John J., to Motorola, Inc. Stripline interdigital band-pass filter. 4,020,428, Cl. 333-73.00S.
Frieseke & Hoepfner GmbH Erlangen-Bruck: *See*—
Prenzel, Karl; and Dittner, Adam, 4,019,614.
Friis, Odd: *See*—
Der Estephanian, Estephan; Foreman, Robert E.; Scott, Robert D.; and Friis, Odd, 4,019,508.
Frisch, Arnold: *See*—
Epley, John M.; Leach, Austin F.; and Frisch, Arnold, 4,020,298.
Fritz, Heinz Peter; Wabner, Dietrich; and Huss, Rainer, to Rheinisch-Westfalisches-Elektriz'atswerk Aktiengesellschaft. Process for making titanium-supported lead electrode. 4,019,970, Cl. 204-32.00R.
Frohling, Josef; and Wiedemer, Karl, to Firm Josef Frohling. Rolling mill. 4,019,358, Cl. 72-189.000.
From, Charles A., Jr.: *See*—
Bassett, Henry C.; From, Charles A., Jr.; Parker, John F.; and Worley, Ansel A., 4,019,250.
Frommer, Werner; Puls, Walter; and Schmidt, Delf, to Bayer Aktiengesellschaft. Process for the production of a saccharase inhibitor. 4,019,960, Cl. 195-80.00R.
Frost, Charles C.: *See*—
Rosin, Walter M.; VanDerMeulen, Douglas J.; and Frost, Charles C., 4,019,789.
Fuhrmeister, Ralph, to Furma Manufacturing Co. Pty. Ltd. Apparatus for riveting. 4,019,238, Cl. 29-243.530.
Fuji Chemical Industry Co., Ltd.: *See*—
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, 4,019,982.
Fuji Photo Film Co., Ltd.: *See*—
Aonuma, Masashi; and Tamai, Yasuo, 4,020,236.
Tamai, Yasuo; Osawa, Sadao; and Honjo, Satoru, 4,019,993.
Fuji Photo Optical Co., Ltd.: *See*—
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Fujii, Hitoshi: *See*—
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Fujii, Masaki: *See*—
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Fujimatsu, Masaaki: *See*—
Nomura, Katsuaki; and Fujimatsu, Masaaki, 4,020,199.
Fujimura, Eiji. Automatic system for providing telephone number information service. 4,020,473, Cl. 340-172.500.
Fujino, Shinichiro: *See*—
Numata, Saburo; and Fujino, Shinichiro, 4,020,363.
Fujita, Toshio; Takahashi, Chigo; Ohshima, Masanari; Ushioda, Tsunezo; and Shimizu, Hirozo, to Chissoasahi Fertilizer Co., Ltd. Method for producing coated fertilizer. 4,019,890, Cl. 71-64.00F.
Fujiwara, Hiroshi; and Suzuki, Hiroshi, to Maruzen Oil Co. Ltd. Metal clad laminate composed of flame resistant thermosetting resin composition. 4,020,225, Cl. 428-251.000.
Fukuda, Kazuichi, to Kanto Special Steel Works, Ltd. Flexible coupling for rotating shafts. 4,019,345, Cl. 64-12.000.
Fukuda, Kazuichi, to Kanto Special Steel Works Ltd. Flexible coupling for rotating shafts. 4,019,346, Cl. 64-12.000.
Fukuoka, Itsuo: *See*—
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, 4,020,446.
Fuller, Matthew H.; and Deever, William R., to Texaco Inc. Methods for fluidizing a filter media. 4,019,985, Cl. 210-80.000.
Fuller, Thaddeus W.: *See*—
Patterson, Richard G.; and Fuller, Thaddeus W., 4,019,210.
Funk, Hans: *See*—
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Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, 4,019,958.
Furma Manufacturing Co. Pty. Ltd.: *See*—
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Furno Electric Company, Limited: *See*—
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Furtwaengler, Gerhard: *See*—
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Furuhama, Teruhide: *See*—
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Negishi, Akira; Takayanagi, Kiyoshi; Ikeda, Masaru; and Kousaka, Shinji, 4,019,899.
Fuselier, Richard A.: *See*—
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Futaki, Kiyoshi: *See*—
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Ray, Richard E.; and Wagner, Hans A., 4,020,079.
Turcotte, Ronald E.; Wolff, Jay R.; Del Medico, Anthony P.; and Lee, Paul C., 4,020,348.
G. Rau: *See*—
Stockel, Dieter; and Oberg, Hans-Jurgen, 4,019,876.
Gagnon, Victor J.: *See*—
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Gakken Co. Ltd.: *See*—
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,020,505.
Gale, Anthony George, to Rolls-Royce (1971) Limited. Means for retaining blades to a disc or like structure. 4,019,833, Cl. 416-220.00R.
Gall, Henry Matthew. Photographic teaching apparatus utilizing a three-coordinate reference system. 4,019,264, Cl. 35-53.000.
Gall, Martin, to Upjohn Company, The. 1-(α-Amino-α-phenyl-o-tolyl-)imidazoles. 4,020,085, Cl. 260-309.000.
Galle, Edward Milburn: *See*—
Stinson, Leon Berthal; and Galle, Edward Milburn, 4,019,785.
Gambale, John C.; and Ray, Roger E., to Westinghouse Electric Corporation. Time division multiplex system for a segregated phase comparison relay system. 4,020,396, Cl. 361-64.000.
Gander, Frederick W.; Hoegger, Erhard F.; and Kane, William P., to Du Pont de Nemours, E. I., and Company. Polyethylene terephthalate/terpolymer blends; films, sheets, and articles made using such blends; and method of making trays using such sheets. 4,020,126, Cl. 260-873.000.
Gangell, David Bruce, to Environ Mechanical Services Pty. Limited. Sprinkler systems. 4,019,582, Cl. 169-37.000.
Gann, Ronald A.: *See*—
Carlson, Elmer A.; Raffaelli, Joseph G.; and Gann, Ronald A., 4,019,854.
Garabedian, Arthur, to Frank, Dudley B. Apparatus for modifying an internal combustion engine. 4,019,479, Cl. 123-198.00F.
Gardner, Richard A., to International Business Machines Corporation. High-alumina content compositions containing BaO-MgO-SiO_2 glass and sintered ceramic articles made therefrom. 4,020,234, Cl. 428-433.000.
Garner, Albert Y., to Monsanto Research Corporation. Flame retardant method. 4,020,224, Cl. 428-272.000.
Garner, Alex Victor; and Townsend, Graham, to Rank Organisation Limited, The. Electro-acoustic transducer diaphragms. 4,020,299, Cl. 179-181.00R.
Garner, Edward M.; and Duley, Raymond S., to NCR Corporation. Pulse train frequency control means. 4,020,366, Cl. 307-271.000.
Garrett Corporation, The: *See*—
Browning, Calvin W., 4,019,335.
Tippetts, Thomas B., 4,019,697.
Garrett, Michael R., to FMC Corporation. Apparatus and method for running, setting and testing a compression-type well packoff. 4,019,580, Cl. 166-315.000.
Garrow, Gerald L.: *See*—
Wright, Edward S.; Angstadt, John W.; and Garrow, Gerald L., 4,020,189.
Gaschler, August: *See*—
Wetzler, Josef; Gaschler, August; and Hofmann, Heinz, 4,019,457.
Gass, William R.; Scala, Luciano C.; and Phillips, David C., to Westinghouse Electric Corporation. Method for coating of polyimide by electrodeposition. 4,019,877, Cl. 428-626.000.
Gauri, Kailash Kumar, to Robugen GmbH. Alkyl-substituted 6-chloro-2-thiouracils. 4,020,070, Cl. 260-251.00R.
Gautier, Christian Jean; and Scarabin, Jean-Marie Pierre, to L'Etat Francais, represente par le Ministre des Postes et Telecommunications; Establissement Public dit "Telediffusion de France"; and Scarabin, Jean-Marie Pierre. Adjustable anamorphic image converter. 4,020,279, Cl. 358-160.000.
Gawel, Len J.; and Chen, Chi-Sin, to Continental Oil Company. Bacterial production of lipase and pyocyanine from n-paraffins. 4,019,959, Cl. 195-66.00R.
Geary, John Michael; and Mattes, Hans George, to Bell Telephone Laboratories, Incorporated. Apparatus for reading optical codes. 4,020,327, Cl. 235-61.11E.
Geer, Loren E., to Xerox Corporation. Encapsulated water paper. 4,020,210, Cl. 428-307.000.
Geerling, Leonardus Johannes, to Neuvex, Inc. Nerve stimulating device. 4,019,519, Cl. 128-422.000.
Geffers, Hans; Radt, Walter; Schliebs, Reinhard; and Schulz, Hartmut, to Bayer Aktiengesellschaft. α-Alkyl-phosphonosuccinic acid com-

pounds and sequestering compositions containing them. 4,020,101, Cl. 260-502.40R.
Geisler, Gottfried: *See—*
Appel, Eggert; Geisler, Gottfried; and Seebode, Albert, 4,019,386.
Geluk, Ronald Jan, to N.V. Optische Industrie de Oude Delft. Mammography. 4,020,347, Cl. 250-361.00R.
Gemmill, Wayne Joseph, Sr.; and Cerone, Frank Ernest, Jr., to Union Carbide Corporation. Generator system. 4,020,351, Cl. 250-432.0PD.
General Atomic Company: *See—*
Carney, Homer Charles, 4,020,368.
General Dynamics Corporation: *See—*
Halpern, Peter H., 4,020,282.
General Dynamics, Pomona Division: *See—*
Strike, Robert, 4,019,440.
General Electric Company: *See—*
Abolins, Visvaldis; Cooper, Glenn D.; and Lee, Gim F., Jr., 4,020,124.
Anderson, Robert T.; Loy, Henry L.; and Nesbit, William J., 4,019,871.
Bochan, John, 4,019,397.
Borman, Willem F. H.; and Rock, John A., 4,020,122.
Brown, Edgar D., Jr.; and Traver, Frank J., 4,019,997.
Cannon, Henry T.; and Taylor, Charlie Edwin, 4,020,401.
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Elder, James H.; and Patterson, Hubert A., 4,020,421.
Ellis, Delmar H.; Baker, John E.; Shaffernocker, Wayne M.; and Scott, Ralph W., 4,019,375.
Ericson, Eric Axel; and Kaufhold, Frederick Daniel, 4,020,301.
Herzog, Josef; Woods, Kenneth K.; and Hubble, William S., 4,019,881.
Jablonski, Richard J.; and Kruh, Daniel, 4,020,303.
Johnson, Donald S.; and Relles, Howard M., 4,020,069.
MacKenzie, Burton Thornley, Jr., 4,020,214.
Manimalethu, Abraham I., 4,020,438.
Markezich, Ronald L., 4,020,089.
Powell, Noble R.; and Irwin, John M., 4,020,334.
Rowe, Richard A., 4,019,794.
Salemme, Charles T.; Ravenhall, Richard; and Harris, David J., 4,019,832.
Service, Alfred Lewis; and Christie, George, Jr., 4,020,014.
White, Dwain M., 4,020,265.
Wyland, Alvin D., 4,020,358.
General Electric Company Limited, The: *See—*
Croxall, Derek Francis; Kell, Robert Christopher; and Lambert, Robert, 4,019,950.
General Mills Chemicals, Inc.: *See—*
MacKay, Kenneth D.; and Rogier, Edgar R., 4,020,081.
General Motors Corporation: *See—*
Klomp, Edward D., 4,019,883.
General Tire & Rubber Company, The: *See—*
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,020,115.
Genini, Maurice: *See—*
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Georg Fischer Aktiengesellschaft: *See—*
Jaggi, Hans; Lehmann, Ernesto; and Rechsteiner, Hugo, 4,019,544.
Georgia-Pacific Corporation: *See—*
Briggs, William Scott; and Kjargaard, Niels J., 4,019,995.
Kelley, Jack R., 4,019,994.
Gerber, Richard: *See—*
Issler, Jorg; and Gerber, Richard, 4,019,796.
Gerding, Paul W. Pharmaceutical dosage distribution apparatus. 4,019,793, Cl. 312-209.000.
Germano, Victor V., to Diamond Shamrock Corporation. Composite coating having enhanced corrosion resistance. 4,020,220, Cl. 428-472.000.
Germanton, Charles E. Pushbutton combination lock. 4,019,355, Cl. 70-278.000.
Gerry, Martin E. Low inertia impact printing means. 4,019,615, Cl. 197-53.000.
Gerry, Martin E. Still image slide with sound track control. 4,020,503, Cl. 360-1.000.
Gesellschaft fur Strahlen- und Umweltforschung mbH: *See—*
Mohn, Helmuth, 4,019,984.
Ghilardi, Hans Peter; and Atasoy, Kaya, to Ciba-Geigy Corporation. Oxytetracycline solution for parenteral, peroral and local administration and processes for the production thereof. 4,020,162, Cl. 424-227.000.
Giannini, Nunzio E., to Packaging Corporation of America. Packing insert and blank therefor. 4,019,672, Cl. 229-14.00C.
Gifford, Bruce M.: *See—*
Owen, A. B.; and Gifford, Bruce M., 4,019,244.
Gilbert, William J., Jr., to Croll-Reynolds Company, Inc. Air pollution control of oxides of nitrogen. 4,019,870, Cl. 23-288.00F.
Gillet, Roger; Berthet, Michel; and Moisson-Franckhauser, Francois, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM); and Electricite de France. Electric rotating machine having a cryo-inductor. 4,020,371, Cl. 310-52.000.
Gilmore-Tatge Manufacturing Co., Inc.: *See—*
Bishop, Jerald W., 4,019,780.
Ginnasi, Alessandro: *See—*
Rescalli, Carlo; and Ginnasi, Alessandro, 4,020,114.
Giordano, Fernand; Marmonier, Pierre; and Vayra, Jean, to Commissariat a l'Energie Atomique. Safety device for a nuclear reactor and especially a fast reactor. 4,019,954, Cl. 176-38.000.
Girling Limited: *See—*
Harrison, Anthony William, 4,019,613.
Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, to Oronzio de Nora Impianti Elettrochimici S.p.A. Novel composite diaphragm material. 4,020,235, Cl. 428-443.000.
Gladu A.G.: *See—*
Salomons, Arnold, 4,019,673.
Glassman, Jacob A. Disposable diaper. 4,019,517, Cl. 128-284.000.
Glasspoole, Eileen A.: *See—*
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Glaxo Laboratories Limited: *See—*
Cocker, John Derek; and Sutherland, Derek Ronald, 4,020,058.
Cook, Martin Christopher; and Laundon, Brian, 4,020,077.
Gleason, John G., to SmithKline Corporation. 7β-Acyloxy cephalosporins. 4,020,057, Cl. 260-243.00C.
Globe-Union Inc.: *See—*
Buckethal, Paul J., 4,019,535.
Godai, Tomokazu: *See—*
Araki, Mutsuro; Sakai, Bunshiro; Watanabe, Itaru; Yamada, Makoto; Tsukada, Koshiro; Godai, Tomokazu; Aida, Isao; and Nakagaki, Masatoshi, 4,020,312.
Goebel, Franz, to GTE Laboratories Incorporated. Primary electrochemical cell capable of high discharge rates. 4,020,248, Cl. 429-164.000.
Goering, Lowell J.; and Voth, Harold William, to Hesston Corporation. Spiral knife sharpener. 4,019,287, Cl. 51-249.000.
Gokyu, Isao, to Nippon Concrete Industries Co. Ltd. Method of making reinforcements for concrete. 4,019,357, Cl. 72-130.000.
Goldenberg, Marvin M.: *See—*
Alaimo, Robert J.; and Goldenberg, Marvin M., 4,020,075.
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, to Instytut Nawozow Sztucznych. Method of manufacturing catalytic tubes with wall-supported catalyst, particularly for steam reforming of hydrocarbons and methanation. 4,019,969, Cl. 204-26.000.
Golightly, David Stainsley; and Onions, Allan, to Albright & Wilson Limited. Air entraining agents. 4,019,916, Cl. 106-88.000.
Goode, George E.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.
Goodman Equipment Corporation: *See—*
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Goodyear Tire & Rubber Company, The: *See—*
Barbier, Jean; and Cachon, Paul, 4,019,939.
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Gookin, Kenneth Earl: *See—*
Shannon, Suel Grant; Timmins, Harold Chester; and Gookin, Kenneth Earl, 4,019,802.
Gorbunow, Walter, to PDI, Inc. Tackifier. 4,020,029, Cl. 260-24.000.
Gordon Johnson Company: *See—*
Scheier, Donald J.; and Frederick, Henry E., 4,019,222.
Gordon, Ronald S.; Sutton, Ralph W.; and Tennenhouse, Gerald J., to Ford Motor Company. Method for preparing shaped, green ceramic compacts. 4,020,134, Cl. 264-63.000.
Gosteli, Jacques, to Ciba-Geigy Corporation. Process for the preparation of 5-substituted resorcinols and related intermediates. 4,020,098, Cl. 260-473.00S.
Gotley, Paul; and Buckenham, Howard Alfred, to Neotronics Limited. Catalytic detecting apparatus for detecting combustible gases and vapors. 4,020,480, Cl. 340-237.00R.
Goto, Takashi: *See—*
Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, 4,019,228.
Gott, Hans: *See—*
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Kleeberg, Ulrich; Leimkuhler, Jurgen; and Kautz, Johannes, 4,019,444.
Gould Inc.: *See—*
Cushman, Robert Holbrook; and Stirner, Kurt R., deceased, 4,019,670.
Gould Inc. Electric Fuse Division: *See—*
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Graco Inc.: *See—*
Eull, Marvin J., 4,019,837.
Scherer, William C.; and Vincent, Raymond A., 4,019,653.
Vork, William D.; and Clements, William, 4,019,395.
Graham, Bruce A.; Puttock, Michael A.; Felauer, Ethel E.; and Neidermyer, Robert W., to Uniroyal Inc.; and Uniroyal, Ltd. Substituted 2,3-dihydro-1,4-oxathiin plant growth. 4,020,168, Cl. 260-327.00P.
Graham Magnetics Incorporated: *See—*
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Grahame, Robert E., Jr.: *See*—
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 4,020,165.

Grant, Jon H., to Etatech, Inc. Pulse width modulated DC-to-DC power converter using a single ended transformer. 4,020,408, Cl. 321-2.000.

Gravell, George William, to Raphael's Limited. Devices for mounting lenses for edge grinding. 4,019,285, Cl. 51-216.0LP.

Grawinger, Otto: *See*—
Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, 4,020,071.

Grayson, Martin: *See*—
Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, 4,020,000.

Green, Edward H. Aerosol valve and sprayhead. 4,019,687, Cl. 239-573.000.

Green, Paul D.: *See*—
Ladin, Eli M.; and Green, Paul D., 4,019,784.

Greenberger, Joseph Irwin, to Wean United, Inc. Rolls in a briquetting machine or like machines. 4,019,846, Cl. 425-194.000.

Greenlee, Hugh T., to Wright Tool & Forge Co., The. Tool handle display and hanger device. 4,019,632, Cl. 206-349.000.

Greenwald, Richard B., to Polaroid Corporation. Highly fluorinated diazides and process therefor. 4,020,176, Cl. 260-349.000.

Gregg, Leonard. Piston puller. 4,019,235, Cl. 29-280.000.

Gregory, Marion B.: *See*—
Kimble, Thomas E.; and Gregory, Marion B., 4,019,418.

Greisman, Samuel, to Thames Sack and Bag Company Limited, The. Heat sealing apparatus. 4,019,946, Cl. 156-497.000.

Greisman, Samuel, to Thames Sack and Bag Company Limited, The. Heat sealing apparatus. 4,019,949, Cl. 156-582.000.

Griffith, Louis E.: *See*—
Ebner, Peter R.; and Griffith, Louis E., 4,020,495.

Grinberg, Jan: *See*—
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,019,867.

Griswold, James L. Trench shoring assembly. 4,019,329, Cl. 61-41.00A.

Griswold, James L. Trench shoring assembly with abrasion protection device. 4,019,330, Cl. 61-41.00A.

Grobman, William, to Molins Machine Company, Inc. Quick-set slotter knife. 4,019,428, Cl. 93-58.20R.

Grois, Khaim Shlemovich: *See*—
Emelyanov, Viktor Ivanovich; Grois, Khaim Shlemovich; and Kadomsky, Dmitry Evgenievich, 4,020,410.

Grossbach, Alfred; and Mertin, Ralf, to Lunke & Sohn GmbH. Sliding door for vehicles, especially automobiles. 4,019,775, Cl. 296-155.000.

Grossman, David H.: *See*—
LeRoy, Rodney L.; Grossman, David H.; McDonald, R. Douglas; and Hemmings, David F., 4,020,443.

Groszek, Aleksander Jerzy; Parkes, Colin Walter; and Crump, Ronald Alfred, to British Petroleum Company Limited, The. Process of protecting underwater surfaces with a wax coating containing biocides. 4,020,200, Cl. 427-416.000.

Grotz, Charles A.: *See*—
Hirt, William J.; and Grotz, Charles A., 4,019,696.

Grous, Philip P.: *See*—
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Grubelich, Francis Thomas, to Combustion Engineering, Inc. Vessel steam relief system for a nuclear reactor. 4,019,955, Cl. 176-38.000.

Grumman Aerospace Corporation: *See*—
Kosson, Robert L.; and Quadrini, John A., 4,01[illegible]571.

Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, [illegible]er; and Weins, Engelbert, to Mannesmann Aktiengesellschaft. Spray cooling of continuously cast ingots. 4,019,560, Cl. 164-89.000.

GSW Appliances Limited: *See*—
Veraart, Pierre H., 4,019,259.

GTE Laboratories Incorporated: *See*—
Fellows, Daniel; Zemon, Stanley; Sturk, Phillip A.; and Stone, Samuel M., 4,019,806.
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GTE Sylvania Incorporated: *See*—
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Hedler, Robert A.; and Slobbe, W. Wentworth, 4,020,231.
Keinath, Rudolph Francis; and Manners, David Eugene, 4,020,390.
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Lagos, Costas C., 4,020,385.
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Guenther, William D., to Dana Corporation. Rotary valve seal assembly. 4,019,487, Cl. 123-190.00E.

Guibet, Jean-Claude: *See*—
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, 4,019,976.

Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, to Rhone-Poulenc-Textile. Process for treating filamentary products. 4,020,196, Cl. 427-248.00G.

Gujer Peter; and Wust, Olivier, to Rieter Machine Works, Ltd. Winding device for automatically changing bobbin tubes. 4,019,690, Cl. 242-18.00A.

Gulf Oil Corporation: *See*—
Dahle, Norman A., 4,020,078.

Gulka, James Allen: *See*—
Frenkel, Robert Leland; Vischer, Peter; and Gulka, James Allen, 4,019,620.

Gulla, Michael, to Shipley Company, Inc. Catalyst composition and method of preparation. 4,020,009, Cl. 252-429.00R.

Gustafson, Kjell Arne Hakan, to Aktiebolaget Bofars. System for determining the deviation of an object from a sight line. 4,020,339, Cl. 250-202.000.

Gustav F. Gerdts KG: *See*—
Schittek, Friedrich, 4,019,532.

Gutman, Arnold D., to Stauffer Chemical Company. Thiolophosphoramidates and their use as insecticides. 4,020,161, Cl. 424-211.000.

Guyer, Robert R.: *See*—
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Guyot, Volker; Holdinghausen, Paul; and Mueller, Martin, to Carl Schenck AG. Method and circuit arrangement for producing and transmitting electrical reference pulses. 4,020,423, Cl. 328-151.000.

Haag, Thomas H.: *See*—
Martorano, Richard; Brendley, William H., Jr.; and Haag, Thomas H., 4,020,219.

Habiger, Cyril W., to Caterpillar Tractor Co. Seat actuated fluid drive neutralizing arrangement. 4,019,602, Cl. 180-101.000.

Habuda, Blair A., Sr.; and Kopatich, Anthony. Pipe hanging apparatus. 4,019,705, Cl. 248-58.000.

Hachadoorian, Robert Haig; and Shyman, Mark Lincoln, to Aquanetics, Inc. Demister-coalescer in a process for removing water from oil. 4,019,977, Cl. 208-188.000.

Hagen, Alexander: *See*—
Klose, Sigmar; Wahlefeld, August Wilhelm; and Hagen, Alexander, 4,019,961.

Hagenbach, Robert J.; and Fenity, Robert D., deceased (by Fenity, Nancy, executrix), to Xerox Corporation. Electrostatic development. 4,019,903, Cl. 96-1.0SD.

Hagenbach, Robert J.: *See*—
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Hagenuk Vormals Neufeldt & Kunke GmbH: *See*—
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Hahnke, Manfred; Papenfuhs, Theodor; and Teige, Wolfgang, to Hoechst Aktiengesellschaft. Process for the spin-dyeing of polymers or copolymers of acrylonitrile. 4,020,037, Cl. 260-42.210.

Haino, Kozo: *See*—
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Haja, Inc.: *See*—
Carmichael, James W., 4,019,597.

Hall, Andrew D. Setting means for doorlock assemblies. 4,019,766, Cl. 292-350.000.

Hall, George R., II; White, Jack M.; and Krechmery, Roger L., to Bailey Meter Company. Glass to metal seal. 4,019,388, Cl. 73-398.0AR.

Halpern, Meyer, coexecutor: *See*—
Asculai, Samuel Simon; Kupferberg, Alfred B., deceased; Kupferberg, Beatrice, coexecutrix; and Halpern, Meyer, coexecutor, 4,020,183.

Halpern, Peter H., to General Dynamics Corporation. High density data processing system. 4,020,282, Cl. 178-68.000.

Hamilton, Stephen P.: *See*—
Cochran, Michael J.; and Hamilton, Stephen P., 4,020,465.

Hammar, Bengt-Olof. Loading device. 4,019,642, Cl. 214-77.00R.

Hanco, Inc.: *See*—
Nassif, Harry A., 4,020,300.

Handweiler, Martin; and Castanis, George. Technique for producing a pre-distorted design format for use in transfer printing. 4,019,436, Cl. 101-463.000.

Haney, Thomas Albert: *See*—
Czaplinski, Thomas V.; and Haney, Thomas Albert, 4,020,355.

Hanley, John F., Jr., to Envirotech Corporation. Coke discharging system. 4,019,963, Cl. 202-263.000.

Hansen, Barton: *See*—
Sauer, Gale E.; and Hansen, Barton, 4,019,300.

Hansen, Lloyd B.; and Smarrella, Eugene R., to Carmet Company. Method of roof drilling. 4,019,590, Cl. 175-57.000.

Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., to Hanson Industries Inc. Ankle pad for footwear. 4,019,266, Cl. 36-119.000.

Hanson, Chris A.: *See*—
Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., 4,019,266.

Hanson, Douglas R. Dough placer improvements. 4,019,621, Cl. 198-432.000.

Hanson Industries Inc.: *See*—
Hanson, Alden B.; Hanson, Chris A.; and Bertetto, Donald W., 4,019,266.

Hanson, Wallace E., to Champion International Corporation. Reinforced reel. 4,019,692, Cl. 242-71.800.

Hapke, Kenyon A.: *See*—
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.

Harbert, Earl W., to Whittaker Corporation. Marine wet exhaust system and improvements in powered marine vessel. 4,019,456, Cl. 115-73.000.

Hardtmann, Goetz E., to Sandoz, Inc. N-(Substituted carbonylmethyl) isatoic anhydrides. 4,020,062, Cl. 260-244.00A.

Hare, Herbert K. Set of game pieces. 4,019,746, Cl. 273-137.0AB.

Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, to General Tire & Rubber Company, The. Alkaline barium alcoholates. 4,020,115, Cl. 260-632.00A.

Harlan, Larry R.; and Thiel, Patrick L., to Westinghouse Electric Corporation. Radiator assembly for fluid filled electrical apparatus. 4,019,572, Cl. 165-106.000.

Harris, David J.: *See*—
Salemme, Charles T.; Ravenhall, Richard; and Harris, David J., 4,019,832.

Harris, Glyn Islwyn: *See*—
Edwards, Alfred Gerald; and Harris, Glyn Islwyn, 4,020,035.

Harris, Jack R. CPR Breastplate compression aid. 4,019,501, Cl. 128-24.00R.

Harris, Louis Selig; Pars, Harry George; Razdan, Raj Kumar; Sheehan, John Clark; and Terris, Barbara Zitko, to Sharps Associates. Use of heterocyclic esters of 5H-[1]benzopyrano [3,4-b]pyridines as analgesics. 4,020,163, Cl. 424-248.550.

Harris, Robert F.; and Tefertiller, Nancy B., to Dow Chemical Company, The. Reaction products of epoxy resins, organic sulfides and protic acids. 4,020,030, Cl. 260-29.2EP.

Harrison, Anthony William, to Girling Limited. Discs for disc brakes. 4,019,613, Cl. 188-218.0XL.

Harrison, Richard A.: *See*—
Cornsweet, Tom N.; and Harrison, Richard A., 4,019,813.

Harrop, William H., to Rohm and Haas Company. Tackifier for rubber. 4,020,048, Cl. 260-51.500.

Hartlapp, Gerhard: *See*—
Roszinski, Hilmar; Lippsmeier, Bernd; and Hartlapp, Gerhard, 4,020,129.

Harvey, Albert J., to Diamond International Corporation. Automatic feeding of labels for application to bottles or other containers. 4,019,935, Cl. 156-64.000.

Harwood, Leopold Albert, to RCA Corporation. Controlled oscillator. 4,020,500, Cl. 358-19.000.

Harzer, Peter; and Funk, Hans, to Wandel u. Goltermann. Method of and system for visually displaying several periodically reproducible input signals. 4,020,392, Cl. 315-386.000.

Harzer, Peter: *See*—
Hoffmann, Gunther; and Harzer, Peter, 4,020,425.

Hasegawa, Akira; Tanigami, Takahiko; and Ushiku, Kenichi, to Nissan Motor Co., Ltd.; and Hitachi, Ltd. Sensor having spring biasing structure to retain conductive bridging inertial mass in a non-operative position. 4,020,302, Cl. 200-61.45R.

Haselbauer, Philip J., to United States of America, Army. Structural cores. 4,020,205, Cl. 428-116.000.

Hashimoto, Shintaro; and Nakanishi, Tosaku, to Sharp Kabushiki Kaisha. Miniaturized key entry and translation circuitry arrangement for a data processing unit. 4,020,467, Cl. 340-172.500.

Hasler, Edmond Francis: *See*—
Martin, Robert Edgar; and Hasler, Edmond Francis, 4,020,488.

Hasse, Adelbert, administrator: *See*—
Ploetz, Theodor, deceased; Hasse, Adelbert, administrator; and Franzen, Volker, 4,019,952.

Hastrup, Niels E., to F. L. Smidth & Co. Rotary packer and method of filling bags. 4,019,546, Cl. 141-10.000.

Hatfield, Edward S. Moisture detecting device. 4,020,478, Cl. 340-235.000.

Hattori, Seiji, to Daido Seiko Kabushiki Kaisha. Ram type steel bar coupling apparatus. 4,019,232, Cl. 29-282.000.

Hauf, Robert Conrad, to Singer Company, The. Automatic buttonholing sizing device. 4,019,449, Cl. 112-158.00B.

Hauser, Hans, to J. B. Foote Foundry Co., The. Shift dog for transmission. 4,019,586, Cl. 192-48.910.

Hawker Siddeley Dynamics Limited: *See*—
Collier, David Thomas, 4,019,804.

Hawkes, George F., Jr.; and Speck, Willis A., to Westinghouse Electric Corporation. Integrated circuit breaker panelboard. 4,020,400, Cl. 361-353.000.

Hawtrey, Charles E.; and Vervais, Paul Walter, to University of Iowa Research Foundation, The. Device for control of female urinary incontinence. 4,019,498, Cl. 128-1.00R.

Hayami, Heijiro; Kotera, Hiroaki; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for separating, combining and rearranging colored images. 4,020,502, Cl. 358-80.000.

Hayashi, Masayuki, to Aisin Seiki Kabushiki Kaisha. Lumbar support regulating apparatus. 4,019,777, Cl. 297-284.000.

Hayes, Larry J.: *See*—
Dixon, Dale D.; and Hayes, Larry J., 4,020,223.

Hazar, Mitchell M., to American Denture Corporation. Means and method for producing custom artificial dentures. 4,019,253, Cl. 32-19.000.

Hazewindus, Nicolaas; and van Nieuwland, Jacob Maria, to U.S. Philips Corporation. Wien filter. 4,019,989, Cl. 250-396.0ML.

Healey, Gerald P. Method of playing a golf game. 4,019,748, Cl. 273-176.0AB.

Hearing Evaluation & Acoustic Research, Inc.: *See*—
Epley, John M.; Leach, Austin F.; and Frisch, Arnold, 4,020,298.

Hedberg, Tommy: *See*—
Andersson, Rolf; Bjorklund, Bengt; and Hedberg, Tommy, 4,019,675.

Hedler, Robert A.; and Slobbe, W. Wentworth, to GTE Sylvania Incorporated. Pigmented phosphors and method of making. 4,020,231, Cl. 428-403.000.

Heidemann, Gerrit, to Industriele Onderneming Wavin N.V. Connection for foam insulated pipes. 4,019,761, Cl. 285-47.000.

Heimann GmbH: *See*—
Meyer, Juergen; and Wendling, Irmtrud, 4,020,474.

Heinrich Baumgarten, Eisen- und Blechwarenfabrik: *See*—
Baumgarten, Gerd D., 4,019,221.

Heinz, Henry, Jr., to Union Carbide Corporation. Galvanic cell having a resealable vent closure. 4,020,241, Cl. 429-54.000.

Heitz, Fernand Alfred Desire, to Thann & Mulhouse. Barium titanate and barium zirconate in radiological contrast products. 4,020,152, Cl. 424-4.000.

Heizer, Kenneth W.: *See*—
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,020,285.

Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, to Kali-Chemie Pharma GmbH. Continuous process of producing pancreatin and product thereof. 4,019,958, Cl. 195-62.000.

Helle, Jacques, to Compagnie d'Electronique et de Piezoelectricite C.E.P.E. Temperature compensation circuit for crystal oscillator. 4,020,426, Cl. 331-158.000.

Heller, William C., Jr.; and Shatzkin, Leonard, to Heller, William C., Jr. Book binding process. 4,019,758, Cl. 281-21.00R.

Hemmer, Gerd; Hess, Klaus; Becker, Rolf; and Liebhaber, Klaus, to BASF Aktiengesellschaft. Quiet and smokeless flaring of off-gases containing hydrocarbons. 4,019,852, Cl. 431-5.000.

Hemmings, David F.: *See*—
LeRoy, Rodney L.; Grossman, David H.; McDonald, R. Douglas; and Hemmings, David F., 4,020,443.

Hendrix Wire & Cable Corporation: *See*—
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Hennel, Waclaw: *See*—
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Hennessy, Douglas J. Propynyloxy alkyl arene insecticides. 4,020,111, Cl. 260-611.00A.

Hepworth, Edward C.: *See*—
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Heraeus-Schott Quarzschmelze GmbH: *See*—
Seiler, Karl; Selke, Martin; Siegling, Oswald; Herzog, Heinz; Albrecht, Horst; and Mohn, Heinrich, 4,019,645.

Hercules Incorporated: *See*—
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Herkes, Frank Edward, to Du Pont de Nemours, E. I., and Company. Control of nitrogen oxide reactions in off-gases from the diazotization/coupling of aromatic amines. 4,020,051, Cl. 260-140.00R.

Herman, Richard: *See*—
Morgen, Melvin; Herman, Richard; and Wolski, Raymond A., 4,019,441.

Herr, Charles H., to Caterpillar Tractor Co. Modular power transmission with self-energizing clutch. 4,019,406, Cl. 74-766.000.

Herrera, Andres. Stack gas clarifier. 4,019,882, Cl. 55-220.000.

Herriman, Straud D. Game with mechanical capture means. 4,019,741, Cl. 273-131.0BA.

Herrmann, Joseph Peter, to Apotheker A. Herbert K.G., Fabrik Pharmazeutischer Praparate Wiesbaden. Methods of and medications for treating cardiac disorders by using strophanthin. 4,020,159, Cl. 424-180.000.

Herscovici, Saul: *See*—
Fresmann, Karl Heinz; and Herscovici, Saul, 4,019,598.

Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, to Akzona Incorporated. Nonwoven horizontal drainage system. 4,019,326, Cl. 61-11.000.

Herzl, Peter J., to Fischer & Porter Co. Digital read-out system for external-sensor vortex flowmeter. 4,019,384, Cl. 73-194.0VS.

Herzog, Heinz: *See*—
Seiler, Karl; Selke, Martin; Siegling, Oswald; Herzog, Heinz; Albrecht, Horst; and Mohn, Heinrich, 4,019,645.

Herzog, Josef; Woods, Kenneth K.; and Hubble, William S., to General Electric Company. Moisture separator for a nuclear steam turbine. 4,019,881, Cl. 55-185.000.

Hess, Klaus: *See*—
Hemmer, Gerd; Hess, Klaus; Becker, Ro. and Liebhaber, Klaus, 4,019,852.

Hesston Corporation: *See*—
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Hestermann, Klaus: *See*—
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Heubeck, Erich, to Siemens Aktiengesellschaft. Dental patients' chair with a parallelogram supporting arm. 4,019,778, Cl. 297-346.000.

Heyer-Schulte Corporation: *See*—
Fitzgerald, Martin Bruce, 4,019,499.

Hiestand, Armin; and Jager, Horst, to Ciba-Geigy Corporation. N-imidazolidinone perfluoroalkylcarboxylic acid ester. 4,020,087, Cl. 260-309.700.

Hileman, Fred Lee, Jr. Self-contained sandblasting apparatus. 4,019,284, Cl. 51-9.00M.

Hill, Horace Earl: *See*—
Christianson, Merrill Andrew; and Hill, Horace Earl, 4,019,827.

Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, to Industrie A. Zanussi S.p.A. Apparatus for visualizing on a kinescope

screen video signals which are either picked up by an antenna or generated in the apparatus itself. 4,020,501, Cl. 358-64.000.
Himmel, David P., to Recognition Equipment Incorporated. Apparatus and a method for storage and retrieval of image patterns. 4,020,463, Cl. 340-146.3AE.
Hinckley, John A. Vehicle connecting device. 4,019,754, Cl. 280-456.00R.
Hinshaw, Jack W.: *See—*
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Hiraga, Kentaro; Okutani, Tetsuya; Asako, Tsunehiko; and Yoshioka, Kouichi, to Takeda Chemical Industries, Ltd. Epiminodeaminodeoxyaminoglycoside antibiotics and intermediates. 4,020,269, Cl. 536-10.000.
Hirai, Hiroshi, to Akebono Brake Industry Co., Ltd. Floating caliper disc brake. 4,019,610, Cl. 188-73.300.
Hirakawa, Hiroshi: *See—*
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Hirt, William J.; and Grotz, Charles A., to Boeing Company, The. Method of and apparatus for enhancing Coanda flow attachment over a wing and flap surface. 4,019,696, Cl. 244-42.0CD.
Hitachi, Ltd.: *See—*
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Ito, Tetsuo; and Nishihara, Motohisa, 4,020,449.
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Hocker, Jurgen; and Merten, Rudolf, to Bayer Aktiengesellschaft. Cyclic aminals of aromatic aldehydes. 4,020,084, Cl. 260-308.00A.
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Hoehn, Hans, to E. R. Squibb & Sons, Inc. 5-Aminomethyl-1H-pyrazolo[3,4-b]pyridines. 4,020,072, Cl. 260-293.600.
Hoexter, Rolf, to Mosstype Corporation. Mounting-proofing machine for flexographic plates. 4,019,434, Cl. 101-216.000.
Hoffman, Arthur Rowland; Kendall, Arthur Harry; and Rohr, Robert Lewis, to International Business Machines Corporation. Method of manufacture of multiple glass nozzle arrays. 4,019,886, Cl. 65-43.000.
Hoffman, Ronald Clarence, to AMP Incorporated. Electrical splice. 4,019,801, Cl. 339-98.000.
Hoffmann, Daniel; and Reynard, Remi, to Societe des Hauts Fourneaux de la Chiers; Coflexip; and Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Hollow flexible tubular body, process and apparatus for making the same. 4,019,539, Cl. 138-118.000.
Hoffmann, Gunther; and Harzer, Peter, to Wandel u. Goltermann KG. Digital settable frequency generator with phase-locking loop. 4,020,425, Cl. 331-16.000.
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Holson, Sheldon, to Holson Company, The. Sleeved photo album page and means and method for making same. 4,019,937, Cl. 156-73.100.
Holson, Sheldon, to Holson Company, The. Photographic album page and method of making same. 4,019,943, Cl. 156-227.000.
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Hotta, Junichi; and Fujii, Masaki, to Mitsubishi Petrochemical Company Limited. Crystalline polyolefins and production thereof. 4,020,264, Cl. 526-142.000.
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Hsieh, Henry L., to Phillips Petroleum Company. Alkene oxide or acrylate polymerization or copolymerization catalyzed by organoaluminum-organophosphine-metal salt of a beta-diketone. 4,020,018, Cl. 260-2.00A.
Hsieh, Henry L., to Phillips Petroleum Company. 1,3-Cyclodiene-acyclic conjugated diene copolymers. 4,020,251, Cl. 526-20.000.
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Huber, Ludwig Konrad, to Pennwalt Corporation. Process for control-

ling algae with tetrahydro-1,3-thiazinium salts. 4,019,891, Cl. 71-67.000.
Hudalla, Mark G.; and Schultz, Steven C., to Minnesota Mining and Manufacturing Company. Applicator for heat-activatable tape. 4,019,948, Cl. 156-519.000.
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Hunt, Clayton Edward, Jr.; and Spooner, Donald James, to Eastman Kodak Company. Sheet registration mechanism. 4,019,732, Cl. 271-245.000.
Hunt, William Joseph, to Beed (Dishwashers) Limited. Food material chopper. 4,019,689, Cl. 241-282.100.
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Eidelberg, Jonah; Mooney, Thomas; and Bauer, Richard A., 4,019,762.
ICL/Scientific: *See—*
Parker, James E., 4,020,006.
Idel, Vladimir Viktorovich. Method of grinding band saw teeth. 4,019,408, Cl. 76-112.000.
Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.): *See—*
Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, 4,019,822.
Igeta, Yosuke: *See—*
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,020,505.
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, to Furno Electric Company, Limited. Ultrasonic wave transmitting system. 4,020,446, Cl. 340-5.00R.
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, to Agency of Industrial Science & Technology; and Fuji Chemical Industry Co., Ltd. Method for treatment of waste water containing organic pollutants. 4,019,982, Cl. 210-30.00R.
Ikebata, Shigeki: *See—*
Kusakawa, Hideaki; Takahashi, Kenzoo; and Ikebata, Shigeki, 4,020,221.
Ikeda, Masaru: *See—*
Negishi, Akira; Takayanagi, Kiyoshi; Ikeda, Masaru; and Kousaka, Shinji, 4,019,899.
Ikelheimer-Ernst, Inc.: *See—*
Ikelheimer, Gerald S.; and d'Andrea, Gilbert, 4,019,674.
Ikelheimer, Gerald S.; and d'Andrea, Gilbert, to Ikelheimer-Ernst, Inc. Rigid walled structures for containers, furniture and the like. 4,019,674, Cl. 229-23.00R.
Ilford Limited: *See—*
Wright, Peter John, 4,019,908.
Illinois Tool Works Inc.: *See—*
Camillo, Charles Carl, 4,019,855.
Imai, Hiroyuki; Itoi, Hidenobu; Shimizu, Hiromu; and Kuroda, Yukio, to Nippon Steel Corporation. Apparatus for forming a refractory lining for a container. 4,019,847, Cl. 425-421.000.
Imai, Masahiro; and Ishikawa, Satoshi, to Honda Giken Kogyo Kabushiki Kaisha. Radiator apparatus in a motorized two-wheeled vehicle. 4,019,595, Cl. 180-33.00R.
Imaizumi, Fujimaro: *See—*
Tsuboi, Takashi; Tachibana, Kyozo; Tamura, Kaoru; and Imaizumi, Fujimaro, 4,020,411.
Imamura, Masanaga, to Ricoh Co., Ltd. Cap with inside stopper for receptacle. 4,019,646, Cl. 215-329.000.
Immer, Hans U.: *See—*
Abraham, Nedumparambil A.; Immer, Hans U.; Nelson, Verner R.; and Sestanj, Kazimir, 4,020,157.
Imoco-Gateway Corporation: *See—*
Weiland, George N., Sr., 4,019,706.
Imperial Chemical Industries Limited: *See—*
Ackerley, Norman; Mack, Peter Albert; and Johnson, David Harold, 4,020,105.
Ackerley, Norman; and Mack, Peter Albert, 4,020,106.
King, Terence; and Rose, John Brewster, 4,020,046.
Peel, Richard Philip; and Sutherland, James Kenneth, 4,020,172.
Industrial Tectonics, Inc.: *See—*
Loberg, Grant M., 4,019,791.
Industrie A. Zanussi S.p.A.: *See—*
Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, 4,020,501.
Industriele Onderneming Wavin N.V.: *See—*
Heidemann, Gerrit, 4,019,761.
Ingham, Herbert S., Jr.: *See—*
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Inoue, Kunihiro: *See—*
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Inoue, Masayoshi: *See—*
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Inoue, Tomoyuki: *See—*
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Inoue, Yoshio: *See—*
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Institut Francais du Petrole: *See—*
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, 4,019,976.
Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf: *See—*
Hoffmann, Daniel; and Reynard, Remi, 4,019,539.
Institute za Metalloobrabotvashti Machini: *See—*
Stoilov, Nikola Dimov; and Hoklar, Ivan Konstantinov, 4,019,245.
Institutul National Pentru Creatie Stinifica si Tehnica: *See—*
Teodorescu, Constantin, 4,019,834.
Instytut Nawozow Sztucznych: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.
Interliz Anstalt: *See—*
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Intermountain Research and Development Corporation: *See—*
Walden, John, 4,019,872.
International Business Machines Corporation: *See—*
Barrett, Michael Conan; and Petterson, Eric Sigfried, 4,020,506.
Cordi, Vincent Anthony; and Edson, Bruce Adam, 4,020,466.
Davis, John Ephraim, Jr., 4,020,281.
Drimak, Edward George; and Metz, Thomas Arthur, 4,020,470.
Gardner, Richard A., 4,020,234.
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International Diagnostic Technology, Inc.: *See—*
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International Standard Electric Corporation: *See—*
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IPEC, Inc.: *See—*
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Irick, Gether, Jr.; and Kelly, Charles A., to Eastman Kodak Company. Polymers stabilized with bis-heterocyclic benzoates. 4,020,041, Cl. 260-45.8NZ.
Irick, Gether, Jr.; and Kelly, Charles A., to Eastman Kodak Company. Oxadiazolylphenyl aromatic ester compounds and their use as ultraviolet stabilizer in organic compositions. 4,020,080, Cl. 260-307.00G.
Irimajiri, Shoichiro; Tanaka, Yoshio; and Kobayashi, Atsushi, to Honda Giken Kogyo Kabushiki Kaisha. Deceleration detector system for motor vehicles with automatic transmission. 4,020,455, Cl. 340-53.000.
Irvin, Charles F., to Westinghouse Electric Corporation. Method and fixture for the assembly of dynamoelectric machines. 4,019,249, Cl. 29-596.000.
Irvine, John L., to Richardson-Merrell Inc. 7-Substituted-2-indolinones. 4,020,179, Cl. 424-274.000.
Irwin, John M.: *See—*
Powell, Noble R.; and Irwin, John M., 4,020,334.
Ishida, Hajime, to Tomy Kogyo Co., Ltd. Baby walker. 4,019,756, Cl. 280-649.000.
Ishigaki, Yukinobu; and Sasamura, Kohei, to Victor Company of Japan, Limited. Rectifying and smoothing circuit. 4,020,409, Cl. 321-10.000.
Ishikawa, Akio: *See—*
Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, 4,019,228.
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Ishikawa, Satoshi: *See—*
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Isogai, Osamu: *See—*
Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, 4,019,822.
Issler, Jorg; and Gerber, Richard, to Robert Bosch G.m.b.H. Separable contact and connection arrangement for ignition cables to a fixed terminal, for example the distributor cap of a distributor-breaker assembly. 4,019,796, Cl. 339-12.00R.
Itek Corporation: *See—*
Ebner, Peter R.; and Griffith, Louis E., 4,020,495.
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, to Hochiki Corporation. Composite-type heat-system fire sensing device. 4,020,442, Cl. 337-299.000.
Ito, Tetsuo; and Nishihara, Motohisa, to Hitachi, Ltd. Signal transmitting and receiving device. 4,020,449, Cl. 340-15.000.
Itoh, Takuji: *See—*
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Itoi, Hidenobu: *See—*
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Ivanhoe Research Corporation: *See—*
Blessing, Hubert; and Benjamin, Kenneth A., 4,019,447.
Iwai, Tadayoshi, to Mutoh Industry Ltd. Device for attaching rollers to a carriage adapted to move along a rail. 4,019,258, Cl. 33-79.00R.
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, to Gakken Co. Ltd. Magnetic sheet player with an adjustable inclined magnetic head. 4,020,505, Cl. 360-101.000.
Iwasaki, Moritaka. Heat exchanging process of refrigerant gas in refrigerator. 4,019,341, Cl. 62-277.000.
Iwasaki, Shozo, to Kabushiki Kaisha Akashi Seisakusho. Hardness tester. 4,019,376, Cl. 73-81.000.
Iyoda, Michio: *See—*
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.
J. B. Foote Foundry Co., The: *See—*
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J & J Tool and Mold Ltd.: *See—*
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J & L Tool & Machine, Inc.: *See—*
Landwerlen, Joseph E., 4,019,454.
J. P. Stevens & Co., Inc.: *See—*
Chase, V. Lindsay, 4,020,135.
Jablonski, Richard J.; and Kruh, Daniel, to General Electric Company. Polyimides prepared from amine terminated prepolymers and olefin containing anhydrides. 4,020,303, Cl. 260-78.0UA.
Jacobs, Philip C., Jr., to Gould Inc. Electric Fuse Division. Electric fuse having undulated fusible element. 4,020,441, Cl. 337-187.000.
Jacobson, Alexander D.: *See—*
Boswell, Donald D.; Grinberg, Jan; Jacobson, Alexander D.; and Myer, Gary D., 4,019,807.
Jacquin, Yves: *See—*
Cosyns, Jean; Franck, Jean-Pierre; Guibet, Jean-Claude; and Jacquin, Yves, 4,019,976.
Jaegle, Bruno; and Furtwaengler, Gerhard, to Siemens Aktiengesellschaft. Polarized electromagnetic relay and method of manufacturing the same. 4,020,434, Cl. 335-230.000.
Jager, Horst: *See—*
Hiestand, Armin; and Jager, Horst, 4,020,087.
Jaggi, Hans; Lehmann, Ernesto; and Rechsteiner, Hugo, to Georg Fischer Aktiengesellschaft. Apparatus for forming a continuous wire into a mat. 4,019,544, Cl. 140-112.000.
Jancis, Elmar H.: *See—*
Hubbard, Winchester L.; Grahame, Robert E., Jr.; Covey, Rupert A.; and Jancis, Elmar H., 4,020,165.
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Janssen, Frits W.; and Sinclair, Edward A., to Goodyear Tire & Rubber Company, The. Plasticity index improvers and method of use. 4,020,026, Cl. 260-3.000.
Japan Exlan Company Limited: *See—*
Nomura, Katsuaki; and Fujimatsu, Masaaki, 4,020,199.
Jaswal, Iqbalsingh; and Pugi, Kalev, to Du Pont of Canada Limited. Recirculating reaction apparatus for continuous preparation of a polyamide. 4,019,866, Cl. 23-260.000.
Javan, Ali, to Massachusetts Institute of Technology. Generating and using coherent optical radiation. 4,020,341, Cl. 250-211.00J.
Jay, Pierre; and Schwachhofer, Ghislain, to Rhone-Poulenc Industries. Dielectric compositions. 4,019,996, Cl. 252-63.700.
Jayne, Gerald John Joseph; and Askew, Herbert Frank, to Edwin Cooper & Company Limited. Sulphur containing lubricating oil additives. 4,019,991, Cl. 252-48.200.
Jean, Leonard Paul: *See—*
La Chance, Ernest Joseph, Sr.; and Jean, Leonard Paul, 4,020,277.
Jenkins, Anthony; and Lovelock, James Ephraim. Selective detection of a constituent in an atmosphere. 4,019,863, Cl. 23-232.00E.
Jenness, Raymond C., to Allis-Chalmers Corporation. Method of equalizing radial load on plurality of pivoted bearing pads. 4,019,787, Cl. 308-73.000.
Jensen, Jens Peter: *See—*
Nicolaisen, Holger; Andersen, Finn Schnoor; and Jensen, Jens Peter, 4,020,435.
Jensen, Wayne E.; and Stanfield, Charles Keith, to B & J Manufacturing Company. Tire rasp having reversible blade holder assemblies. 4,019,234, Cl. 29-79.000.
Jerde, James B.; and van Blerk, Victor B., to Digital Dynamics, Inc. Digital valve assembly. 4,019,533, Cl. 137-599.000.
Jex Co., Ltd.: *See—*
Yamauchi, Akira; Kakuma, Tetsu; Yamashita, Hisao; and Ariga, Masahiko, 4,019,226.
Jirele, James E., to Owatonna Tool Company. Puller apparatus and method for disassembling universal joints. 4,019,233, Cl. 29-261.000.
Jochmann, Ludwig V., to Dow Chemical Company, The. Facade clad buildings and method. 4,019,296, Cl. 52-268.000.
John Zink Company: *See—*
Reed, Robert D., 4,019,466.
Johnson, David Harold: *See—*
Ackerley, Norman; Mack, Peter Albert; and Johnson, David Harold, 4,020,105.
Johnson, Donald S.; and Relles, Howard M., to General Electric Company. Preparation of aromatic tetracarboxylic acids. 4,020,069, Cl. 260-520.00E.
Johnson, Dwight N., to Singer Company, The. Inlet orifice device to control thruput flow for pressure regulators. 4,019,531, Cl. 137-504.000.
Johnson, James H. Automatic or semi-automatic firearm. 4,019,423, Cl. 89-178.000.
Johnson, John J., IV. Beam suspension system. 4,019,298, Cl. 52-594.000.
Johnson, Lance A. Guide for tool or instrument. 4,019,256, Cl. 33-79.00A.
Johnson, Marvin M.; Tabler, Donald C.; and Nowack, Gerhard P., to Phillips Petroleum Company. Selective hydrogenation process. 4,020,119, Cl. 260-677.00A.
Johnson, Norman Allen. Lever actuated caliper brake. 4,019,608, Cl. 188-59.000.
Johnson, Robert R.: *See—*
Strubel, David G.; and Johnson, Robert R., 4,019,520.
Johnson, Wayne C.: *See—*
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Joly, Jean: *See—*
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Jones, Ferris E. Table. 4,019,443, Cl. 108-137.000.
Jones, Julius Dwight; and Junod, Dale Milton, to International Business Machines Corporation. Method and apparatus of checking to determine if a signal is present on more than one of n lines. 4,020,460, Cl. 340-146.1AB.
Joseph, Joseph Peter: *See—*
Bernstein, Seymour; Joseph, Joseph Peter; and Nair, Vijay, 4,020,160.
Junod, Dale Milton: *See—*
Jones, Julius Dwight; and Junod, Dale Milton, 4,020,460.
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Kabushiki Kaisha Akashi Seisakusho: *See—*
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Kabushiki Kaisha Daini Seikosha: *See—*
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Kabushiki Kaisha Komatsu Seisakusho: *See—*
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Kabushiki Kaisha Suwa Seikosha: *See—*
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Kabushiki Kaisha Tomita Sangyo: *See—*
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Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
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Kadomsky, Dmitry Evgenievich: *See—*
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Kaji, Hidehiko: *See—*
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Kakegawa, Eiya: *See—*
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Kali-Chemie Pharma GmbH: *See—*
Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, 4,019,958.
Kalil, Eugene J.: *See—*
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Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, to Chemische Werke Huls Aktiengesellschaft. Continuous process for the removal of monomeric impurities from aqueous dispersions of homo- and copolymers of vinyl chloride. 4,020,032, Cl. 260-29.60R.
Kallmeyer, Albert W.: *See—*
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Kalopissis, Gregoire; and Vanlerberghe, Guy, to Societe Anonyme dite: L'Oreal. Surface active agents. 4,020,155, Cl. 424-70.000.
Kameda, Naomi: *See—*
Bolz, Gunner; Deindoerfer, Fred H.; Hu, Chun P.; Kameda, Naomi; and Wang, Robert, 4,020,151.
Kamegaya, Takeo: *See—*
Kaneko, Ryuichi; Yokozawa, Minori; Suzuki, Shigemitsu; and Kamegaya, Takeo, 4,020,280.
Kamin, Arthur; and Evans, Clifford A. Yoke mechanism for fluid displacement device. 4,019,841, Cl. 418-257.000.
Kaminaka, Yoshinori: *See—*
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, 4,020,442.
Kamiya, Minoru. Stratified combustion type engine. 4,019,473, Cl. 123-32.0ST.
Kamner, Haim J., to Goodman Equipment Corporation. Shaker conveyor and drive mechanism therefor. 4,019,626, Cl. 198-750.000.
Kampman, Lester R.; and Hodgson, James H., to Chromalloy American Corporation. Hay carrying apparatus. 4,019,643, Cl. 214-505.000.
Kan, Ryuzo: *See—*
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Kaneko, Ryuichi; Yokozawa, Minori; Suzuki, Shigemitsu; and Kamegaya, Takeo. Pulse width luminance modulation system for a DC gas discharge display panel. 4,020,280, Cl. 358-242.000.
Kaniecki, Janeck, to Lissot, Jean. Automated apparatus for shaping the beak or bill of young fowl. 4,019,513, Cl. 128-223.000.
Kant, Michel: *See—*
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Kanto Special Steel Works, Ltd.: *See—*
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Fukuda, Kazuichi, 4,019,346.
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Karalus, George C.: *See—*
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Karasudani, Isao; Takashima, Toshiyuki; and Bokuda, Yoshiyuki, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Laminated glass structures and process for production thereof. 4,020,217, Cl. 428-429.000.
Karlsson, Frans Harry: *See—*
Faxen, Per Torsten; and Karlsson, Frans Harry, 4,019,529.
Karsan, Demir I. Apparatus and method for buffering submerged conduits. 4,019,333, Cl. 61-110.000.
Kasley, Samuel J.: *See—*
Zweigle, Maurice L.; and Kasley, Samuel J., 4,020,256.
Kathawala, Faizulla G., to Sandoz, Inc. 5-(2-Aminophenyl)-s-triazoles. 4,020,083, Cl. 260-308.00R.
Kato, Kimpei: *See—*
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Kattoh, Tsutomu; Kumabe, Junichi; and Hirabayashi, Satoshi, to Dainippon Ink and Chemicals, Incorporated. Coloring compositions of powder form. 4,020,040, Cl. 260-42.560.
Kauffman, Robert N.: *See—*
Smith, James D. B.; and Kauffman, Robert N., 4,020,017.
Kaufhold, Frederick Daniel: *See—*
Ericson, Eric Axel; and Kaufhold, Frederick Daniel, 4,020,301.
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Kausche, Helmold; and Schauer, Alois, to Siemens Aktiengesellschaft. Thin film circuit. 4,020,222, Cl. 428-209.000.
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Kawamoto, Itsushi: *See—*
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Kawamoto, Yoji: *See—*
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Kay, James A., Jr., to Philip Morris Incorporated. Maintaining plasticizer temperature in tobacco filter rod formation, and apparatus therefor. 4,019,942, Cl. 156-180.000.
Kayser, Lutz Tilo. Process and apparatus for continuously conveying particulate material. 4,019,783, Cl. 302-25.000.
Kazitani, Shiro: *See—*
Sasaki, Kichiro; Takeuchi, Kazuo; Kazitani, Shiro; Shimizu, Kazuo; and Yoshida, Yoshiteru, 4,019,543.
Kealy, Joseph P., to Swift Chemical Company. Slow acting fertilizer. 4,019,889, Cl. 71-29.000.
Kedzia, Stanislaw: *See—*
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Keen, Everett Morgan; Siciliano, Anthony John; Shah, Kiran Chhabildas; Artamonoff, Serge; and Stigen, Leonard Roy, to Diamond International Corporation. System for controlling feed of livestock. 4,019,461, Cl. 119-18.000.
Kehr, Wolfgang: *See—*
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Kell, Robert Christopher: *See—*
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Keller, Andrew: *See—*
Frank, Frederick Charles; Keller, Andrew; and Mackley, Malcolm Robert, 4,020,266.
Keller, Guenter; Klinger, Friedrich; Pohl, Andreas; Schimanski, Gerhard; and Zuber, Guenter, to Carl Schenck AG. Hydraulic chucking head. 4,019,378, Cl. 73-103.000.
Kelley, Jack R., to Georgia-Pacific Corporation. Process for the preparation of aqueous magnetic material suspensions. 4,019,994, Cl. 252-62.520.
Kelly, Charles A.: *See—*
Irick, Gether, Jr.; and Kelly, Charles A., 4,020,041.
Irick, Gether, Jr.; and Kelly, Charles A., 4,020,080.
Kelly, Robert C.; and Nelson, Norman A., to Upjohn Company, The. 4α,6-Dihydroxy-2β-carboxaldehyde-3α-tetrahydropyranacetic acid γ-lactone, 6-alkyl ethers. 4,020,173, Cl. 260-343.600.
Kelver, William L.; Stuckey, Ronald L.; and Rozema, Arthur L., to CTS Corporation. Variable resistance control. 4,020,445, Cl. 338-312.000.
Kemmerer, Marlin. Valve construction. 4,019,714, Cl. 251-138.000.
Kempster, Edward, to Thyssen (Great Britain) Limited. Mining. 4,019,327, Cl. 61-35.000.
Kenaio, Abdulwahab. Pneumatically operated spear gun. 4,019,480, Cl. 124-61.000.
Kendall, Arthur Harry: *See—*
Hoffman, Arthur Rowland; Kendall, Arthur Harry; and Rohr, Robert Lewis, 4,019,886.
Kenkelen, Charles W., to Rabin, Melvin G. Combined fan and noisemaker. 4,019,277, Cl. 46-175.00R.
Kennecott Copper Corporation: *See—*
Lueders, Robert E.; Kust, Roger N.; and Szabo, Lester J., 4,020,143.
Kennedy, Joseph P.; and Vidal, Alain, to University of Akron, The. Bigraft copolymers and process for the preparation thereof. 4,020,127, Cl. 260-878.00R.
Kern, Josef, to Siemens Aktiengesellschaft. Relay having two winding supports. 4,020,437, Cl. 335-299.000.
Kerschbaum, Arthur P.: *See—*
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Kerschbaum, Richard Lynn, to Daedalus Enterprises, Inc. Mobile infrared apparatus for mapping thermal variations and method employing same. 4,020,344, Cl. 250-330.000.
Kerz, Phillip D. Identification marker. 4,019,272, Cl. 40-316.000.
Kestel, Frederick J. Adjustable three-point tractor hitch. 4,019,753, Cl. 280-415.00A.
Khananashvili, Lotari Mikhailovich: *See—*
Andrianov, Kuzma Andrianovich; Bagrov, Georgy Nikolaevich; Vasilieva, Tatyana Vsevolodovna; Vasjukov, Vladimir Alexandrovich; Lebedev, Sergei Ivanovich; Makarov, Vladimir Alexandrovich; and Khananashvili, Lotari Mikhailovich, 4,020,226.
Khoury, Nick S., to Continental Group, Inc., The. Childproof closure. 4,019,648, Cl. 220-273.000.
Kibler, Ralph J.; and Wolfe, Otho C., to United States of America, Army. Three-barrel pistol, electrode fired. 4,019,273, Cl. 42-1.00R.
Kiku, Toyochika: *See—*
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Kimble, Thomas E.; and Gregory, Marion B., to D. H. Baldwin Company. Organ stop tablet mechanism. 4,019,418, Cl. 84-343.000.
Kimura, Toshihiro; and Narikiyo, Yasumasa, to Okuma Machinery Works Ltd. Feed rate control system for numerical control machine tool. 4,020,331, Cl. 235-151.110.
King, David W.: *See—*
Patrick, Charles T., Jr.; and King, David W., 4,019,500.
King, Herbert R., to Milliken Research Corporation. Beam creel. 4,019,700, Cl. 242-131.100.
King, Terence; and Rose, John Brewster, to Imperial Chemical Industries Limited. Aromatic polysulphone coated article and bonded structure. 4,020,046, Cl. 260-900.000.
Kingry, Gary W.: *See—*
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Kirk, Allen Gregg: *See—*
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Kirkvold, Charles F.: *See*—
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Kirsch, Norton M., to Auto Gard, Inc. Auto headlight lens shield. 4,020,338, Cl. 240-46.530.
Kister, Albert T.; and Lutz, Eugene F., to Shell Oil Company. Oligomerization reaction system. 4,020,121, Cl. 260-683.15D.
Kitagawa, Hiroshi: *See*—
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Kitajewski, Ryszard; Sweet, Anthony William; and Dyer, Michael Philip, to International Standard Electric Corporation. Presence and direction of line current flow detector. 4,020,294, Cl. 179-18.0FA.
Kitamura, Masatsugu; and Kobari, Harukuni, to Victor Company of Japan, Limited. System for time compression and expansion of audio signals. 4,020,291, Cl. 179-15.55T.
Kitchen, Earl M. Leash with slip loop. 4,019,463, Cl. 119-109.000.
Kjargaard, Niels J.: *See*—
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Kleeberg, Ulrich; Leimkuhler, Jurgen; and Kautz, Johannes, to Gottfried Bischoff Bau Kompl. Method of and apparatus for incinerating refuse. 4,019,444, Cl. 110-7.00R.
Klein, Schanzlin & Becker Aktiengesellschaft: *See*—
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Klose, Sigmar; Wahlefeld, August Wilhelm; and Hagen, Alexander, to Boehringer Mannheim G.m.b.H. Analytical enzymatic determination. 4,019,961, Cl. 195-103.50R.
Knopfel, Hans-Dieter; and Matthias, Heinz-Bernd, to Klein, Schanzlin & Becker Aktiengesellschaft. Centrifugal pump with inducer. 4,019,829, Cl. 415-143.000.
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Sasaki, Kichiro; Takeuchi, Kazuo; Kazitani, Shiro; Shimizu, Kazuo; and Yoshida, Yoshiteru, 4,019,543.
Koch, Paolo; and Anfossi, Bartolomeo, to ANIC S.p.A. Method for synthesizing thiocarbamic acid esters. 4,020,093, Cl. 260-455.00A.
Koebner, Adolf. Chemical condensation products, their preparation and use. 4,019,921, Cl. 106-238.000.
Koehl, Jean Marie Gerard Rene. Arrangement for making a prefabricated wall. 4,019,328, Cl. 61-41.00A.
Koga, Mamoru; and Matsunobu, Masanori. Adjustable electrode positioning device for electric spark machining apparatus. 4,020,313, Cl. 219-69.00E.
Koh-I-Noor Rapidograph, Inc.: *See*—
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Kohmoto, Keisuke: *See*—
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Kohmura, Isao; Futaki, Kiyoshi; and Haino, Kozo, to Mitsubishi Paper Mills, Ltd. Heat-sensitive recording sheets. 4,020,232, Cl. 428-411.000.
Koike, Hiroshi: *See*—
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Kolowski, Michael A.; and Siefert, George J., to Goodyear Tire & Rubber Company, The. Chipperless radial ply tire. 4,019,551, Cl. 152-354.000.
Kolterer, Franz, to Koltron Corporation. Resist application for selective plating of etched sheets of precision chemical machined components. 4,019,458, Cl. 118-321.000.
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Kondo, Takeo; Hyodo, Yoichi; Ono, Hiroyuki; and Yuasa, Shiro, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Aisin Seiki Kabushiki Kaisha. Shock absorbing type steering device. 4,019,403, Cl. 74-492.000.
Konomi, Toshiaki; Nurita, Jyoji; and Masuda, Takeshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel system for multicylinder engines. 4,019,483, Cl. 123-141.000.
Koons, Margaret R. Frying pan grease shield. 4,019,497, Cl. 126-299.00C.
Kopatich, Anthony: *See*—
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Kopito, Louis; and Schuster, Samuel R., to Ovutime, Inc. Mucus sampling and measuring systems, devices and processes. 4,019,820, Cl. 356-205.000.
Koppensteiner, Eugene F.: *See*—
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.
Koppers Company, Inc.: *See*—
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Koppl, Leo T. Removable plug for pipe junction, and method and apparatus for installing. 4,019,541, Cl. 139-94.000.
Kornblum, Daniel; and Efroymson, John S. Enemata administering device. 4,019,515, Cl. 128-246.000.
Korner, Wilhelm: *See*—
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Korthaus, Helmut: *See*—
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Korver, Clayton Paul. Replaceable lens surfacing pad with integral wear indicating pattern. 4,019,289, Cl. 51-395.000.
Kosak, John R., to Du Pont de Nemours, E. I., and Company. Catalytic reduction of halonitroaromatic compounds. 4,020,107, Cl. 260-580.000.
Kosaka, Kenzo: *See*—
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Kosson, Robert L.; and Quadrini, John A., to Grumman Aerospace Corporation. Gravity assisted wick system for condensers, evaporators and heat pipes. 4,019,571, Cl. 165-105.000.
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Kostrukoff, Serge, to United States of America, Navy. Towed hydrophone preamplifier and receiver. 4,020,450, Cl. 340-15.5GC.
Kotera, Hiroaki: *See*—
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Koyama, Mikihiro, to Honda Giken Kogyo Kabushiki Kaisha. Motorized two-wheeled vehicle construction with power unit swing system. 4,019,594, Cl. 180-33.00A.
Kraftco Corporation: *See*—
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Kragh, Loren G. Magma cooling tower. 4,019,951, Cl. 159-4.0CC.
Krasnow, Leonard L. Extended area filters. 4,019,987, Cl. 210-232.000.
Kraus, Edmund J.: *See*—
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Kraus, Robert A.; and Kraus, Edmund J. Torque release wrench. 4,019,412, Cl. 81-52.40R.
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Krechmery, Roger L.: *See*—
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Kreft, Holger, to Maschinenfabrik Augsburg-Nurnberg AG. Beam and strut girder. 4,020,202, Cl. 428-33.000.
Kremer, Alphonse E. Rotary valve engine with lubricator. 4,019,488, Cl. 123-190.0BB.
Kropf, Frederic F. Food delivery system for restaurants. 4,019,605, Cl. 186-1.00R.
Krude, Werner, to Lohr & Bromkamp GmbH. Ball grooves for a constant velocity universal joint. 4,019,347, Cl. 64-21.000.
Krueger, Robert Harold, to Borg-Warner Corporation. Corrosion inhibitors for absorption refrigeration systems. 4,019,992, Cl. 252-68.000.
Kruh, Daniel: *See*—
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Kuceski, Vincent P., to C. P. Hall Company, The. Purification of diphenyl terephthalate. 4,020,099, Cl. 260-475.0PN.
Kuijk, Karel Elbert, to U.S. Philips Corporation. Resistance read amplifier. 4,020,364, Cl. 307-242.000.

Kulkarni, Avinash D.; and Newton, Ralph E., to Westinghouse Electric Corporation. Regenerative-cycle incandescent lamp containing $HgBr_2$ additive. 4,020,380, Cl. 313-222.000.

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Kurth, William T., to Mobil Tyco Solar Energy Corporation. Solar cell mounting and interconnecting assembly. 4,019,924, Cl. 136-89.00P.

Kurtz, Joseph M., to GTE Sylvania Incorporated. Cathode ray tube packaging. 4,019,637, Cl. 206-418.000.

Kusakawa, Hideaki; Takahashi, Kenzoo; and Ikebata, Shigeki, to Mitsubishi Denki Kabushiki Kaisha. Thin film device. 4,020,221, Cl. 428-166.000.

Kust, Roger N.: *See—*
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Labadini, William M.; Passmore, Edmund M.; and Anderson, Warren A., to GTE Sylvania Incorporated. Method of pulsing incandescent lamp filaments. 4,020,383, Cl. 313-344.000.

La Chance, Ernest Joseph, Sr.; and Jean, Leonard Paul, to Hendrix Wire & Cable Corporation. Spacer for aerial cables. 4,020,277, Cl. 174-146.000.

Lachner, Otto; Beyerlein, Ludwig; and Spelthahn, Klaus, to Lever Brothers Company. Method of injection moulding hollow preforms. 4,020,137, Cl. 264-90.000.

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Lacroix, Jean R. Oil lamp. 4,019,856, Cl. 431-298.000.

Ladin, Eli M.; and Green, Paul D., to Federal-Mogul Corporation. High-impact capacity bail bearing assembly. 4,019,784, Cl. 308-6.00R.

Lagos, Costas C., to GTE Sylvania Incorporated. Fluorescent lamp having conductive film and protective film therefor. 4,020,385, Cl. 313-489.000.

Lahouste, Jean; Lemattre, Maurice; Muller, Jean-Claude; and Stein, Claude, to Societe Chimique des Charbonnages. Process for manufacturing polymers of bicyclo [2.2.1] heptene-2 and its substitution derivatives. 4,020,021, Cl. 260-2.50H.

Lakra, Paul, to C.A.V. Limited. Fuel injection systems. 4,019,481, Cl. 123-139.00E.

Lal, Joginder, to Goodyear Tire & Rubber Company, The. Preparation of halogenated polymers. 4,020,250, Cl. 526-13.000.

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Lamy, Jacques Edouard, to C. G. Doris. Devices for protecting the bases of structures immersed in a volume of water against undermining. 4,019,332, Cl. 61-86.000.

Landell, Harper; and Michel, John M., to Woodstream Corporation. Trolling bucket with loading latch means. 4,019,274, Cl. 43-55.000.

Landwerlen, Joseph E., to J & L Tool & Machine, Inc. Boat plug apparatus. 4,019,454, Cl. 114-197.000.

Lang, John L. Gelled reagent materials. 4,020,005, Cl. 252-316.000.

Langner, Rene J., to Bio/Physics Systems, Inc. Flowing fluid mixing device and method. 4,019,721, Cl. 259-4.0AC.

Laporte Industries Limited: *See—*
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Leder, Lewis B.; Schottmiller, John C.; and Schroeder, Harold H., to Xerox Corporation. Photoreceptor fabrication. 4,019,902, Cl. 96-1.500.

Lee, Earnest M.; and Clyma, Grady L., to Roll-O-Matic Chain Company. Bulkhead assembly and counterbalance mechanism therefor. 4,019,442, Cl. 105-376.000.

Lee, Gim F., Jr.: *See—*
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Lee, Phillip L.: *See—*
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Lehew, Donald L. Protective device for rackets. 4,019,736, Cl. 273-73.00R.

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Leinweber, Donald Harder; and Neis, Thomas Walter, to Sperry Rand Corporation. Pushbutton switch/annunciator for aircraft instruments. 4,020,309, Cl. 200-314.000.

Lejdegard, Sixten Harald; and Bjorklind, Stig Lennart, to Bulten-Kanthal Aktiebolag. Screw package. 4,019,631, Cl. 206-347.000.

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Lenderink, Thomas A.; and Hordyk, Roger P., to Lenderink, Inc. Machine for shear-slicing wood. 4,019,548, Cl. 144-175.000.

Leon, Denny; and Stewart, Frederick M., to FMC Corporation. Wheelchair restraint device. 4,019,752, Cl. 280-179.00R.

Leon, Rudolph Cesar, Sr.: *See—*
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Desse, Pierre; and Trezeguet, Jean-Pierre, 4,019,538.

Lesage, Jean. Fishing reel. 4,019,693, Cl. 242-84.20B.

L'Etat Francais, represente par le Ministre des Postes et Telecommunications: *See—*
Gautier, Christian Jean; and Scarabin, Jean-Marie Pierre, 4,020,279.

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van den Ouweland, Godefridus Antonius Maria; and Peer, Hendricus Gerardus, 4,020,170.

Levesque, Gerard A.; and Saidla, Glen E. W., to Exxon Research and Engineering Company. Method and apparatus for mixing viscous materials. 4,019,720, Cl. 259-4.00R.

Levine, Fred, to Acme Service Corporation. Motor mounting structure. 4,019,704, Cl. 248-16.000.

Levy, Emanuel Edward; and Wolff, Martin Jay, to Sperry Rand Corporation. Hair treatment method and device. 4,019,260, Cl. 34-97.000.

Lewis, Joseph Earle: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,019,887.

Lewis, Kenneth Llewellyn: *See—*
Prince, Eric Victor Donald; Lewis, Kenneth Llewellyn; and Ralph, Leonard John Michael, 4,019,941.

Leybold-Heraeus GmbH & Co. KG: *See—*
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Li, George S.: *See—*
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Li, Yi-Sheng; Leon, Rudolph Cesar, Sr.; and Perry, Eugene Norman, to Lockheed Missiles & Space Company, Inc. Self-rescue breathing apparatus. 4,019,509, Cl. 128-147.000.

Libbey-Owens-Ford Company: *See—*
Snow, Richard R., 4,019,885.

Liclican, Rafael A. Apparatus and shingled strip formed therefrom. 4,019,728, Cl. 270-58.000.

Lieberman, Sidney, to Reading Door Closer Corporation. Piston assembly for door closer. 4,019,220, Cl. 16-59.000.

Liebhaber, Klaus: *See—*
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Linde Aktiengesellschaft: *See—*
Springmann, Helmut, 4,019,314.

Lindelow, Ernst C-G: *See—*
Englund, Gosta R.; and Lindelow, Ernst C-G, 4,019,617.

Linder, Ernst, to Robert Bosch G.m.b.H. Vehicular fog headlight. 4,020,336, Cl. 240-9.500.

Lindsay, Frederick H. Floor frame assembly for a mobile building. 4,019,299, Cl. 52-648.000.

Linsenmeyer, Arthur: *See—*
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Lippsmeier, Bernd; Hestermann, Klaus; and Reuter, Martin, to Hoechst Aktiengesellschaft. Production of tertiary methylphosphine oxides. 4,020,110, Cl. 260-606.50P.

Lippsmeier, Bernd: *See—*
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Livigni, Russell Anthony: *See—*
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,020,115.

Ljung, Bo Hans Gunnar, to Singer Company, The. Vibratory gyroscope. 4,019,391, Cl. 73-505.000.

Lloyd, Geoffrey Oliver; Rhoades-Brown, John Ernest; and Saunders, Stuart Richard John, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Prevention of corrosion of metals. 4,019,926, Cl. 148-6.350.

Loberg, Grant M., to Industrial Tectonics, Inc. Ball bearing retention construction. 4,019,791, Cl. 308-217.000.

Lockheed Missiles & Space Company, Inc.: *See—*
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Lockwood, John J.: *See—*
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Lodzinski, Fred P., to Nekoosa Papers Inc. Optical property measurement and control system. 4,019,819, Cl. 356-73.000.

Logan, Maurus C., to Thomas & Betts Corporation. Method of splicing elongate members. 4,019,241, Cl. 29-407.000.

Lohr & Bromkamp GmbH: *See—*
Krude, Werner, 4,019,347.

Long, David T.: *See—*
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Look, Thomas F.; Podvin, Richard T.; and Weigel, Carlyle A., to Minnesota Mining and Manufacturing Company. Strip applying device. 4,019,945, Cl. 156-405.000.

Lopatin, Vladimir Viktorovich: *See—*
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.

Lorah, Lawrence D.; Stresau, Richard W.; Lapson, Lawrence B.; and van Vloten, Curtis P., to Rapifax Corporation. Optical scanner. 4,019,811, Cl. 350-274.000.

Lord, Thomas J., to United Aircraft Products, Inc. Mixing valve. 4,019,678, Cl. 236-12.00A.

Lotgering, Frederik Karel; and Vromans, Petrus Helena Gerardus Maria, to U.S. Philips Corporation. Magnetic device operating with the photomagnetic effect. 4,020,475, Cl. 340-174.0YC.

Lotz, Alexander: *See—*
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Lovelock, James Ephraim: *See—*
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Lueders, Robert E.; Kust, Roger N.; and Szabo, Lester J., to Kennecott Copper Corporation. Use of raw manganese nodules for oxidation leaching of reductively roasted manganese nodules. 4,020,143, Cl. 423-32.000.

Lundell, Vernon J. Round bale forming machine. 4,019,309, Cl. 56-341.000.

Lunke & Sohn GmbH: *See—*
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Lutz, Eugene F.: *See—*
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Mabuchi, Kenichi; and Tsuchimochi, Yoshihisa, to Mabuchi Motor Co. Ltd. Cell adapter. 4,020,245, Cl. 429-100.000.

Mabuchi Motor Co. Ltd.: *See—*
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Macander, Rudy F.: *See—*
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Mack, Peter Albert: *See—*
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Ackerley, Norman; and Mack, Peter Albert, 4,020,106.

MacKay, Kenneth D.; and Rogier, Edgar R., to General Mills Chemicals, Inc. Certain benzoxazoles and the use thereof as metal extractants. 4,020,081, Cl. 260-307.00D.

MacKenzie, Burton Thornley, Jr., to General Electric Company. Method of making an insulated electrical conductor using pressureless curing of filled ethylene containing polymeric compositions, and an insulated conductor formed thereby. 4,020,214, Cl. 428-389.000.

Mackley, Malcolm Robert: *See—*
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MacLellan, Roy A.: *See—*
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MacMillan Bloedel Limited: *See—*
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Maddox, Harry L., to Western Electric Company, Inc. Method and apparatus for testing welds between dissimilar metals by using the seebeck effect. 4,019,364, Cl. 73-15.0FD.

Maeda, Isamu; Koike, Hiroshi; and Ohara, Takashi, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Process for preparing tertiary amines. 4,020,059, Cl. 260-243.00B.

Maeda, Shigeo: *See—*
Tsunoda, Takahiro; Ozutsumi, Minoru; Maeda, Shigeo; Suzuka, Susumu; Komiya, Hidetoshi; and Shinohara, Hideaki, 4,019,907.

Magnavox Company, The: *See—*
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Caspari, Fred W., 4,020,484.

Magnuson, Roland A., to Paccar Inc. Vehicular mounted tow missile system. 4,019,422, Cl. 89-1.815.

Mahe, Jean, to Produits Chimiques Ugine Kuhlmann. Polydispersible pigment compositions. 4,019,923, Cl. 106-308.00Q.

Mahler, Peter; Frey, Gerhard; and Lerch, Gotthard, to Leybold-Heraeus GmbH & Co. KG. System for irradiating flowable material. 4,020,352, Cl. 250-436.000.

Mahoney, Robert D.; and Schneider, Stephen E., to Dow Chemical Company, The. Microporous polyethylene hollow fibers and process of preparing them. 4,020,230, Cl. 428-398.000.

Mailfert, Alain; and Kant, Michel, to Agence Nationale de Valorisation de la Recherche (ANVAR). Superconducting electric motors. 4,020,374, Cl. 310-80.000.

Maingueneau, Jean-Marie, to SCAL - Societe de Conditionnements en Aluminum. Sealant barrier for electrical cables. 4,020,276, Cl. 174-23.00R.

Makarov, Vladimir Alexandrovich: *See—*
Andrianov, Kuzma Andrianovich; Bagrov, Georgy Nikolaevich; Vasilieva, Tatyana Vsevolodovna; Vasjukov, Vladimir Alexandrovich; Lebedev, Sergei Ivanovich; Makarov, Vladimir Alexandrovich; and Khananashvili, Lotari Mikhailovich, 4,020,226.

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Mallon, Robert T.: *See—*
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Mallory, Glenn O., Jr., to Richardson Chemical Company, The. Electroless nickel polyalloy plating baths. 4,019,910, Cl. 106-1.000.

Malmin, Oscar. Endodontic operating instrument. 4,019,254, Cl. 32-57.000.

Malonee, Arley L. Brake monitoring system. 4,020,454, Cl. 340-52.00B.

Manabe, Kenshi: *See—*
Suzuki, Yasoji; Manabe, Kenshi; and Hirasawa, Masataka, 4,020,362.

Mandel, Alan F.; and Vercellotti, Leonard C., to Westinghouse Electric Corporation. Signal input devices and systems. 4,019,607, Cl. 187-29.00R.

Mandt, Mikkel G., to Houdaille Industries, Inc. Disinfection system and method. 4,019,983, Cl. 210-62.000.

Manimalethu, Abraham I., to General Electric Company. Autotransformer with series and tertiary windings having same polarity impedance. 4,020,438, Cl. 336-5.000.

Mannara, Giuseppe: *See—*
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Manners, David Eugene: *See—*
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Mannesmann Aktiengesellschaft: *See—*
Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, Peter; and Weins, Engelbert, 4,019,560.

Manning, Frank. Programmable arrays. 4,020,469, Cl. 340-172.500.

Manning, William L., to EG&G, Inc. Bulb-shaped flashtube with metal envelope. 4,020,379, Cl. 313-220.000.

Manty, Bruce R., to Lawrence Peska Associates, Inc., a part interest. Gutter protector. 4,019,290, Cl. 52-11.000.

Marcatili, Enrique Alfredo Jose; and Marcuse, Dietrich, to Bell Telephone Laboratories, Incorporated. Optimized parabolic-index optical fiber communication system with incoherent light source. 4,019,805, Cl. 350-96.00C.

Marchetti, Enzo. 2-Aminomethyl- and 2-(2-aminoethyl)-substituted 4,5-diphenyloxazoles. 4,020,082, Cl. 260-307.00R.

Marcuse, Dietrich: *See—*
Marcatili, Enrique Alfredo Jose; and Marcuse, Dietrich, 4,019,805.

Marforio, Nerino, to Rockwell-Rimoldi S.p.A. Workpiece guide for sewing machines. 4,019,448, Cl. 112-153.000.

Marin, M. James; and Mersereau, Robert E., to Pitney-Bowes, Inc. Sheet material stacking and transfer apparatus. 4,019,640, Cl. 214-6.00H.

Markel, Richard F.: *See—*
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Markezich, Ronald L., to General Electric Company. Method for making n-alkylphthalimides. 4,020,089, Cl. 260-326.00R.

Marmonier, Pierre: *See—*
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Marshall, John Joseph: *See—*
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Marshall, Robert Moore; and Dardoufas, Kimon Constantine, to Allied Chemical Corporation. Production of polyester tire yarn polyglycol ether spin finish composition. 4,019,990, Cl. 252-8.900.

Martin, Harry F., to Westinghouse Electric Corporation. Positive closure system for free floating disc valve. 4,019,712, Cl. 251-26.000.

Martin, Keith Fraser: *See—*
Mercer, Frank Brian; and Martin, Keith Fraser, 4,020,208.

Martin Marietta Corporation: *See—*
Wills, Milton Herman, Jr., 4,019,918.

Martin, Robert Edgar; and Hasler, Edmond Francis. Alarm and/or control apparatus. 4,020,488, Cl. 340-412.000.

Martin, William O.; and Derda, Harry, to Case Western Reserve University. Head support and restraining apparatus. 4,019,727, Cl. 269-328.000.

Martorano, Richard; Brendley, William H., Jr.; and Haag, Thomas H., to Rohm and Haas Company. Metal decorating method involving mechanical shaping. 4,020,219, Cl. 428-460.000.

Marukawa, Katsukiyo: *See—*
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Mashimo, Yukio: *See—*
Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, 4,020,433.

Masili, Dino: *See—*
Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, 4,020,501.

Mason, Daniel W.; and Walton, Richard S., to Motorola, Inc. Liquid crystal watch module. 4,019,313, Cl. 58-23.00R.

Mason, Harold F. Drum stand. 4,019,709, Cl. 248-150.000.

Masoneilan International, Inc.: *See—*
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Massey-Ferguson Services N.V.: *See—*
Quick, Donald J., 4,019,308.

Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., to Caterpillar Tractor Co. Anti-noise mounting means for transmissions. 4,019,600, Cl. 180-70.00R.

Masuda, Takeshi: *See—*
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Mathews, George P.; and Lech, Thaddeus, Jr., to Borg-Warner Corporation. Automatic slack adjuster with internal reference point. 4,019,612, Cl. 188-196.0BA.

Mathys, Wilbur L.: *See—*
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Matsuda, Yukinobu: *See—*
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Matsudo, Kazuo; Shimomura, Takayoshi; Kurokawa, Teruo; and Arayama, Takao, to Nippon Kokan Kabushiki Kaisha. Enameling cold rolled steel sheet with a high enamel adhesive property. 4,019,929, Cl. 148-31.500.

Matsumoto, Kazuya, to Canon Kabushiki Kaisha. Method of color image recording. 4,019,817, Cl. 355-132.000.

Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.). Pencils not requiring sharpening. 4,019,822, Cl. 401-96.000.

Matsunobu, Masanori: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Matzelle, Ralph Anthony, to Caterpillar Tractor Co. Piston pump with floating port plate providing variable force balance for hydrostatic balance. 4,019,425, Cl. 91-487.000.

Maurer, Donald D.; and Sorenson, Paul D., to Medtronic, Inc. Electrical stimulation system. 4,019,518, Cl. 128-419.00R.

Maxitrol Company: *See—*
McMann, Wilbur S.; and Stang, Charles, Jr., 4,019,569.

Mayer, Uwe; and Schundehutte, Karl-Heinz, to Bayer Aktiengesellschaft. Oxadiazepine cationic dyestuffs. 4,020,063, Cl. 260-247.50H.

McAllister, Owen Earl, to Combustion Engineering, Inc. Adjustable split door jamb. 4,019,303, Cl. 52-745.000.

McCall, Richard C. Apparatus for reading and recharging condenser ionization chambers. 4,020,349, Cl. 250-377.000.

McCole, Thomas P., to Polaroid Corporation. Flat battery and method of manufacture. 4,019,251, Cl. 29-623.200.

McCollough, John K., Jr.; and Stewart, William H., Jr., to Milliken Research Corporation. Apparatus for the application of liquids to moving materials. 4,019,352, Cl. 68-205.00R.

McCreary, Norman B.: *See—*
Meredith, Robert Wayne; and McCreary, Norman B., 4,019,703.

McCulloch, Michael G.; and Nelson, Woodrow E., to Theracon, Inc. Method of producing dry pet food. 4,020,187, Cl. 426-72.000.

McCullough, Edward R. Guard fixture for a fireplace grate. 4,019,493, Cl. 126-165.000.

McCullough, Robert W., to Milliken Research Corporation. Tension control. 4,019,701, Cl. 242-152.100.

McDonald, Donald C., to O. S. Walker Company, Inc. Lifting magnet for layered pipe. 4,020,436, Cl. 335-286.000.

McDonald, R. Douglas: *See—*
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McDonnell Douglas Corporation: *See—*
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McFarlane, James I.: *See—*
Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., 4,019,859.

McGhie, Russell P.; Bredholt, Olaf; and Rockefeller, Winston G., to Colgate-Palmolive Company. Methods and apparatus for foldably closing the ends of laminated metal-plastic tubes. 4,019,305, Cl. 53-39.000.

McIntyre, Donald B.; and McIntyre, Frederic S., to Acumeter Laboratories, Inc. Process for discontinuous coating of a web by periodic deflection thereof against a fluid coating. 4,020,194, Cl. 427-172.000.

McIntyre, Frederic S.: *See—*
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McKeever, Carl W., to Lyall Electric, Inc. Terminal crimping machine. 4,019,362, Cl. 72-421.000.

McKeever, Carl William, to Lyall Electric, Inc. Stripping and defillering method and apparatus. 4,019,409, Cl. 81-9.510.

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McKirdy, James A. Device for the application of chemicals to field crops and/or other plant concentrations. 4,019,278, Cl. 47-1.500.

McKnight, Lee Graves, to Bell Telephone Laboratories, Incorporated. Voltage surge protector. 4,020,398, Cl. 361-60.000.

McMann, Wilbur S.; and Stang, Charles, Jr., to Maxitrol Company. Burner control circuit. 4,019,569, Cl. 165-26.000.

McNeil Laboratories, Incorporated: *See—*
Mohrbacher, Richard J.; and Grous, Philip P., 4,020,055.

Means, William A., to Applied Motors, Inc. Reversing control for DC. motors of the permanent magnet field type. 4,020,403, Cl. 318-257.000.

Medtronic, Inc.: *See—*
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Mefina S.A.: *See—*
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Meijer, Roelf Jan, to U.S. Philips Corporation. Hot-gas reciprocating engine. 4,019,322, Cl. 60-525.000.

Meisel, Thomas C., Jr., to Caterpillar Tractor Co. Work vehicle having variable curvature blade assembly. 4,019,587, Cl. 172-802.000.

Melger, Helga: *See—*
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Melliger, Hans: *See—*
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Mensch, William D., Jr.: *See—*
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Mercer, Frank Brian; and Martin, Keith Fraser, to Netlon Limited. Extruded plastic mesh. 4,020,208, Cl. 428-255.000.

Merck & Co., Inc.: *See—*
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Merckel, Gerard: *See—*
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Meredith, Robert Wayne; and McCreary, Norman B. Trolling motor safety mount. 4,019,703, Cl. 248-4.000.

Merrill, R. F., to Phillips Petroleum Company. Poly(arylene sulfide) coating compositions containing alkali metal alkylbenzenesulfonate. 4,020,031, Cl. 260-29.20R.

Mersereau, Robert E.: *See—*
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Merten, Rudolf: *See—*
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Mertin, Ralf: *See—*
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Merz, Walter, to Schweizerische Aluminium AG. Elevating and conveying system for unloading vessels or the like. 4,019,641, Cl. 214-14.000.

Messer Griesheim GmbH: *See—*
Schumann, Gunter; and Becker, Werner, 4,020,405.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
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Messervey, Harry Clifford, to Borden, Inc. Dual wheel discharge for can tester. 4,019,622, Cl. 198-441.000.

Metco, Inc.: *See—*
Dittrich, Ferdinand J.; Durmann, George J.; and Ingham, Herbert S., Jr., 4,019,875.

Metrologic Instruments, Inc.: *See—*
Punis, Giancarlo, 4,020,357.

Metrosonics, Inc.: *See—*
Ceci, Barry L., 4,020,286.

Metz, Thomas Arthur: *See—*
Drimak, Edward George; and Metz, Thomas Arthur, 4,020,470.

Meyer, Emilio G., to Leeds & Northrup Italiana S.p.A. Detector for an infrared analyzer. 4,020,345, Cl. 250-343.000.

Meyer, Juergen; and Wendling, Irmtrud, to Heimann GmbH. Manipulatable read-out memory. 4,020,474, Cl. 340-173.0SP.

Meyer, Leon J. Metal flange web connection. 4,019,302, Cl. 52-730.000.

Michaylov, Lubomir, to Crown Zellerbach Corporation. Extrusion of polyolefin onto paper at decreased temperatures. 4,020,215, Cl. 428-420.000.

Michel, John M.: *See—*
Landell, Harper; and Michel, John M., 4,019,274.

Michon, Dominique; and Staron, Philippe, to Compagnie Generale de Geophysique. Method and apparatus for recording seismic signals. 4,020,447, Cl. 340-7.00R.

Mijnheer, Andries; and De Jonge, Albert Klaas, to U.S. Philips Corporation. Refrigerator. 4,019,336, Cl. 62-6.000.

Miklas, Edward J.: *See—*
Christmann, Harold F.; and Miklas, Edward J., 4,020,120.

Miles, Bert Benton, to Combustion Engineering, Inc. Support for furnace tubes. 4,019,468, Cl. 122-510.000.

Milesi, Domenico: *See—*
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Millard, Keith, to Decatur Electronics, Inc. Traffic radar and apparatus therefor. 4,020,490, Cl. 343-8.000.

Miller, Arthur William; and Atkinson, William, to Laporte Industries Limited. Process for the production of alumina. 4,019,978, Cl. 208-213.000.

Miller, Jeanne Marylyn. Artificial tree. 4,020,201, Cl. 428-8.000.

Miller, Kenneth J.: *See—*
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Miller, Lester I., to Du Pont de Nemours, E. I., and Company. Coating composition for flexible substrates. 4,020,216, Cl. 428-425.000.

Miller, Matt. Hanging jar cap with storing unit. 4,019,638, Cl. 211-74.000.

Miller, Thomas G. Animal size sorting and control gate. 4,019,464, Cl. 119-155.000.

Milliken Research Corporation: *See—*
Dana, Paul Robert, 4,019,662.
King, Herbert R., 4,019,700.
McCollough, John K., Jr.; and Stewart, William H., Jr., 4,019,352.
McCullough, Robert W., 4,019,701.

Minami, Shunji, to Matsushita Electric Industrial Co., Ltd. Electronic channel selector. 4,020,420, Cl. 325-464.000.

Mineral Research & Development Corporation: *See—*
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Minnesota Mining and Manufacturing Company: *See—*
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Hudalla, Mark G.; and Schultz, Steven C., 4,019,948.
Look, Thomas F.; Podvin, Richard T.; and Weigel, Carlyle A., 4,019,945.
Proulx, Arthur Z., 4,020,504.
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Sinclair, Robin A.; and Glasspoole, Eileen A., 4,019,865.
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Miura, Tadashi; Nomura, Tomio; and Kubota, Kohei, to Toa Nenryo Kogyo Kabushiki Kaisha. Method for preparing hydrocarbon conversion catalyst. 4,020,012, Cl. 252-441.000.

Miura, Tadashi: *See—*
Nishikawa, Eiichiroh; Itoh, Takuji; and Miura, Tadashi, 4,020,011.

Miyakawa, Hideaki: *See—*
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Miyake, Takeo: *See—*
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Miyauchi, Katsuki; Matsuyama, Iwao; and Toda, Gyozo, to Hitachi, Ltd. Method of producing optically transparent ceramics. 4,019,915, Cl. 106-73.310.

Mizutani, Hiroshi; and Ono, Hitoshi, to Nihon Senshoku Kikai Kabushiki Kaisha; and Takeni Senka Kabushiki Kaisha. Apparatus for fluid treatment of a fiber product. 4,019,351, Cl. 68-177.000.

Mobil Oil Corporation: *See—*
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Mobil Tyco Solar Energy Corporation: *See—*
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Modine, Arthur B., to Modine Manufacturing Company. Heat exchanger. 4,019,573, Cl. 165-175.000.

Modine Manufacturing Company: *See—*
Modine, Arthur B., 4,019,573.

Moeller, Wolfgang W. Mechanical dispenser. 4,019,655, Cl. 222-96.000.

Moerman, Nathan A. Conversion and control of electrical energy by electromagnetic induction. 4,020,440, Cl. 336-155.000.

Mohn, Heinrich: *See—*
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Mohn, Helmuth, to Gesellschaft fur Strahlen- und Umweltforschung mbH. Continuous filter with pressing means. 4,019,984, Cl. 210-66.000.

Mohr, Richard A.; Bhalla, Sushil K.; and Zeh, Peter H., to FMC Corporation. Process for drying sodium carbonate peroxide. 4,020,148, Cl. 423-415.00P.

Mohrbacher, Richard J.; and Grous, Philip P., to McNeil Laboratories, Incorporated. Intermediates for 2-aminobenzodiazepine-5-ones. 4,020,055, Cl. 260-239.30D.

Moisson-Franckhauser, Francois: *See—*
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Mongeon, Robert J.: *See—*
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Monroe, Robert C., to Hudson Products Corporation. Bearing assembly. 4,019,792, Cl. 308-219.000.

Monsanto Company: *See—*
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Thomas, Dorsey O., Jr.; and Terry, Alvah B., 4,019,414.

Monsanto Research Corporation: *See—*
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Montagnino, James G.: *See—*
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Montalto, Michael Samuel, to Eastman Kodak Company. Sheet registration mechanism. 4,019,733, Cl. 271-245.000.

Montedison Fibre S.p.A.: *See—*
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Mooney, Thomas: *See—*
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Moore, William B., III: *See—*
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Moorman, Maurice D.; and Albrecht, Leonard N. Root control planter. 4,019,279, Cl. 47-25.000.

Mora, Camillo Corvi, to Camillo Corvi S.p.A. Nitrolamines. 4,020,074, Cl. 260-293.580.

Morehead, Chalmers, to Westinghouse Electric Corporation. Integral mercury-vapor pressure regulating means for fluorescent lamp. 4,020,378, Cl. 313-174.000.

Morgan, Barrie O.: *See—*
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Morgan, Charles R., to W. R. Grace & Co. Hydantoin-containing polythiol compositions. 4,020,086, Cl. 260-309.500.

Morgan, Charles Robert, to W. R. Grace & Co. Heat activated ethylenically unsaturated-polythiol compositions. 4,020,233, Cl. 428-419.000.

Morgan, John A.: *See—*
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Morgen, Melvin; Herman, Richard; and Wolski, Raymond A., to United States of America, Army. Warhead enable switch for use in a missile. 4,019,441, Cl. 102-70.20R.

Mori, Yasunori, to Hitachi, Ltd. Ignition apparatus for internal combustion engine. 4,019,484, Cl. 123-148.00E.

Morikawa, Hiroyuki; Sato, Takahiro; and Okada, Isao, to Mitsubishi Petrochemical Company Limited. Process for producing isoprene trimers. 4,020,118, Cl. 260-666.00B.

Morikawa, Naotake: *See—*
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Moritomo, Sadao, to Seiko Seiki Kabushiki Kaisha. Grinding method and apparatus. 4,019,288, Cl. 51-327.000.

Morley, John Glyn: *See—*
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Morrin, Thomas Harvey, II, to International Business Machines Corporation. Method and apparatus for form removal from contour compressed image data. 4,020,462, Cl. 340-146.3AE.

Morris, J. Wayne, to UOP Inc. Combination reactor-separator apparatus. 4,019,869, Cl. 23-288.00R.

Mortensen, Harold Richard, to Facet Enterprises, Inc. Engine starter gearing. 4,019,393, Cl. 74-6.000.

Morton, Kenneth O., to Cluett, Peabody & Co., Inc. Apparatus for controllably lowering and lifting a ply picking unit. 4,019,729, Cl. 271-18.300.

Morton-Norwich Products, Inc.: *See—*
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Moskowitz, David, to Ford Motor Company. Cemented titanium carbide tool for intermittent cutting application. 4,019,874, Cl. 75-241.000.

Mosstype Corporation: *See—*
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Motorola, Inc.: *See—*
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Mason, Daniel W.; and Walton, Richard S., 4,019,313.
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Mott, James D., to Hydril Company. Subsurface well apparatus having flexing means and method of using same. 4,019,574, Cl. 166-.500.

Mrugala, Theodore A., to Warner & Swasey Company, The. Grinding machine loader assembly. 4,019,283, Cl. 51-103.00C.

Mueller, Martin: *See—*
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Mueller-Tamm, Heinz: *See—*
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Muller, Louis M. Aquarium tank cover. 4,019,460, Cl. 119-5.

Munnis, David V.: *See—*
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Murphy, Paschal H., Jr. Energy converter. 4,019,325, Cl. 60-643.000.

Murphy, William F., to Munnis, David V., a part interest. Construction panel. 4,019,297, Cl. 52-309.200.

Murray, Ransom James; and Brown, Arthur William, to Associated Portland Cement Manufacturers Limited, The. Early strength cements. 4,019,917, Cl. 106-89.000.

Murray, Thomas E.; and Bocchino, Vincent T., to Norda Incorporated. Controlled fragrance releasing crystal beads. 4,020,156, Cl. 424-76.000.

Musashi, Akira: *See—*
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Muse, Edward T. Multi smoker. 4,020,322, Cl. 219-392.000.

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Nakagawa, Tadao, to Nisshin Kogyo Kabushiki Kaisha. Fluid level alarm device. 4,020,481, Cl. 340 244.00E.

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Nakanishi, Akira: *See—*
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Nakao, Shinroku, to Combi Co., Ltd. Multi-purpose infant's wheeled chair. 4,019,751, Cl. 280-31.000.
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Navato, Jose Miguel Antonio Rosario. Pictorial room thermometer. 4,019,368, Cl. 73-356.000.
Nayfa, James E. Mill fiber treatment apparatus. 4,019,225, Cl. 19-66.00R.
Naylor, Floyd E., to Phillips Petroleum Company. Catalyst for preparation of polybutadiene. 4,020,007, Cl. 252-429.00B.
Naylor, Floyd E., to Phillips Petroleum Company. Catalysts for producing high trans-polybutadiene. 4,020,008, Cl. 252-429.00B.
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Neff, Gregor N. Amphibian culture by insect feeding. 4,019,459, Cl. 119-3.000.
Negishi, Akira; Takayanagi, Kiyoshi; Ikeda, Masaru; and Kousaka, Shinji, to Furukawa Electric Co., Ltd., The. Erosion-resistant materials. 4,019,899, Cl. 75-134.00F.
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Neotronics Limited: *See—*
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Netlon Limited: *See—*
Mercer, Frank Brian; and Martin, Keith Fraser, 4,020,208.
Nettesheim, Raphael Daniel; and Guyer, Robert R., to Schwaab, Inc. Cast impregnated molding plate for molding printing plates. 4,020,138, Cl. 264-130.000.
Neuffer, Klaus, to Daimler-Benz Aktiengesellschaft. Installation for increasing the brightness differences in combined motor vehicle lights. 4,020,457, Cl. 340-66.000.
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Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, to Lever Brothers Company. Cheese flavor containing alkyl amines and process of flavoring. 4,020,190, Cl. 426-534.000.
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Nicholas, Kenneth Ernest Lewis; and Morley, John Glyn, to British Cast Iron Research Association, The. Foundry moulding materials. 4,020,027, Cl. 260-17.200.
Nicolaisen, Holger; Andersen, Finn Schnoor; and Jensen, Jens Peter, to Danfoss A/S. Hinged armature relay. 4,020,435, Cl. 335-275.000.
Niece, Melvin L., to NBS Incorporated. Device for sanitary pickup of ground deposited excrement. 4,019,768, Cl. 294-19.00R.
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Nishikawa, Eiichiroh; Itoh, Takuji; and Miura, Tadashi, to Toa Nenryo Kogyo Kabushiki Kaisha. Method for preparing hydrocarbon conversion catalyst. 4,020,011, Cl. 252-441.000.
Nishimiya, Torazo; and Sasayama, Takao, to Hitachi, Ltd. Air-fuel ratio regulating apparatus for an internal combustion engine with exhaust gas sensor characteristic compensation. 4,019,474, Cl. 123-32.0EE.
Nishiyama, Yumiko: *See—*
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Nolley, John P., Jr., to UOP Inc. Fractionation of hydrocarbons. 4,019,979, Cl. 208-353.000.
Nomura, Katsuaki; and Fujimatsu, Masaaki, to Japan Exlan Company Limited. Process for producing acrylic fibers having animal hair-like hand. 4,020,199, Cl. 427-334.000.
Nomura, Tomio: *See—*
Miura, Tadashi; Nomura, Tomio; and Kubota, Kohei, 4,020,012.
Noranda Mines Limited: *See—*
Cote, Toussaint, 4,019,725.
Norda Incorporated: *See—*
Murray, Thomas E.; and Bocchino, Vincent T., 4,020,156.
Norris, Orlin R. Steam generating system including means for reinitiating the operation of a steam bound boiler feed pump. 4,019,680, Cl. 237-9.00R.
Norsworthy, Ross W., to CRS Industries, Inc. Linearized odor transducer. 4,019,367, Cl. 73-23.000.
North American Philips Corporation: *See—*
Bolt, Barry; and Peters, Petrus, 4,020,382.
Northrop Corporation: *See—*
Zamfirescu, Napoleon Leon, 4,019,392.
Norton Company: *See—*
Weaver, Gerald Q.; and Olson, Bradford A., 4,019,913.
Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue,

Yoshio; and Fujii, Hitoshi, to Dai Nippon Printing Company Limited; and Shin-Etsu Chemical Company Limited. Planographic printing plates and a method of preparing them using photopolymerizable organopolysiloxanes with maleimido groups. 4,019,904, Cl. 96-33.000.

Nowack, Gerhard P.: *See—*
Johnson, Marvin M.; Tabler, Donald C.; and Nowack, Gerhard P., 4,020,119.

Nozaki, Toll, to Fuji Xerox Co., Ltd. Xerographic reproduction process and toner carrier for use therewith. 4,020,192, Cl. 427-19.000.

Nozi, Akio. Tire air pressure system for automotive vehicles. 4,020,456, Cl. 340-58.000.

Nukata, Hironari: *See—*
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.

Nukem G.m.b.H.: *See—*
Fabian, Hans, 4,019,867.

Numata, Saburo; and Fujino, Shinichiro, to Fuji Photo Optical Co., Ltd. Integration circuit with a positive feedback resistor. 4,020,363, Cl. 307-229.000.

Nurita, Jyoji: *See—*
Konomi, Toshiaki; Nurita, Jyoji; and Masuda, Takeshi, 4,019,483.

Nuss, Christopher, to Chrysler Corporation. Automobile acceleration control for fuel economy. 4,019,475, Cl. 123-103.00E.

Nussbaumer, Henri J., to International Business Machines Corporation. Digital filter for filtering complex signals. 4,020,333, Cl. 235-156.000.

N.V. Optische Industrie de Oude Delft: *See—*
Geluk, Ronald Jan, 4,020,347.

Nystrom, Karl Gustav, to Aktiebolaget Svenska Flaktfabriken. Apparatus for removing dust from region adjacent doctor blade. 4,019,953, Cl. 162-272.000.

O. S. Walker Company, Inc.: *See—*
McDonald, Donald C., 4,020,436.

Oberg, Hans-Jurgen: *See—*
Stockel, Dieter; and Oberg, Hans-Jurgen, 4,019,876.

O'Connor, Chadwell; and Charlson, Richard A., to O'Connor, Chadwell. Instrument support socket. 4,019,710, Cl. 248-181.000.

Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, to Hitachi Shipbuilding and Engineering Co., Ltd. Apparatus for generating high-pressure gas. 4,019,319, Cl. 60-39.46S.

Oda, Shinichi; Nakanishi, Akira; and Kuroda, Takio, to Kanzaki Paper Manufacturing Co., Ltd. Copy sheet for use in pressure sensitive manifold sheet. 4,020,261, Cl. 428-325.000.

O'Dell, Marvin, to Raymond Lee Organization, Inc., The, a part interest. Motorcycle chain lock. 4,019,354, Cl. 70-236.000.

Oden, Kenneth W., to Dixie-Narco, Inc. Tandem column vender apparatus. 4,019,650, Cl. 221-116.000.

Oelsch, Kurt; and Schulz, Klaus, to Fernsteuergerate, Kurt Oelsch KG. Slider arrangement for potentiometers or the like. 4,020,444, Cl. 338-202.000.

Oess, Frederick G.; and Peshock, Michael, Jr., to Texas Instruments Incorporated. Cathode structure for a multibeam cathode ray tube. 4,020,381, Cl. 313-302.000.

Oetjen, Georg-Wilhelm; and Warncke, Ernst, to Dragerwerk Aktiengesellschaft. Protective breathing device having a filtering apparatus and additional oxygen supply for emergency use. 4,019,507, Cl. 128-142.00R.

Ofstead, Eilert A., to Goodyear Tire & Rubber Company, The. Metathesis polymerization of cycloolefins. 4,020,254, Cl. 526-128.000.

Ogasawara, Masafumi; Akita, Masanori; Saito, Kazuhiko; Kikuchi, Yoshikazu; and Shiokawa, Mitsuhiro, to Toray Industries, Inc. Apparatus for producing multiple layers conjugate fibers. 4,019,844, Cl. 425-131.500.

Ogden, Wilbur L.: *See—*
Conforti, Frederick J.; and Ogden, Wilbur L., 4,020,479.

Oguma, Yoichi: *See—*
Tsukahara, Takeshi; Morioka, Minoru; Oguma, Yoichi; and Omori, Yoshitaka, 4,019,774.

Ogura, Katsuyuki: *See—*
Tsuchihashi, Genichi; and Ogura, Katsuyuki, 4,020,171.

Oh, Chan S., to Beckman Instruments, Inc. Non-schiff base field effect liquid crystal composition. 4,020,002, Cl. 252-299.000.

Ohara, Takashi: *See—*
Maeda, Isamu; Koike, Hiroshi; and Ohara, Takashi, 4,020,059.

Ohren, Tom H.; and Kingry, Gary W., to Procter & Gamble Co., The. Spray-dried granular detergent containing aluminosilicate, silicate, and pyrophosphate. 4,019,999, Cl. 252-140.000.

Ohshima, Masanari: *See—*
Fujita, Toshio; Takahashi, Chigo; Ohshima, Masanari; Ushioda, Tsunezo; and Shimizu, Hirozo, 4,019,890.

Ohta, Motomu, to Cegedur Societe de Transformation de l'Aluminium Pechiney. Compressor for a refrigerant gas. 4,019,342, Cl. 62-469.000.

Oikawa, Mitsuru: *See—*
Nagashiro, Waichi; Okabe, Tadao; Sumioka, Atsushi; and Oikawa, Mitsuru, 4,020,191.

Oishi, Noritoshi: *See—*
Yoshikawa, Haruzo; Shimano, Keiji; and Oishi, Noritoshi, 4,019,419.

Oji Paper Co., Ltd.: *See—*
Tsunoda, Takahiro; Ozutsumi, Minoru; Maeda, Shigeo; Suzuka, Susumu; Komiya, Hidetoshi; and Shinohara, Hideaki, 4,019,907.

Okabe, Tadao: *See—*
Nagashiro, Waichi; Okabe, Tadao; Sumioka, Atsushi; and Oikawa, Mitsuru, 4,020,191.

Okada, Isao: *See—*
Morikawa, Hiroyuki; Sato, Takahiro; and Okada, Isao, 4,020,118.

Okamura, Kouichi, to Matsushita Electric Industrial Co., Ltd. Clamping device adapted to clamp plate-like members. 4,019,764, Cl. 292-288.000.

Okaya, Tsutomu: *See—*
Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, 4,019,228.

Okazaki, Ryoji; Aoki, Kan; and Shinagawa, Tomoyuki, to Matsushita Electric Industrial Co., Ltd. Primary-cells. 4,020,242, Cl. 429-66.000.

Okuma Machinery Works Ltd.: *See—*
Kimura, Toshihiro; and Narikiyo, Yasumasa, 4,020,331.

Okutani, Tetsuya: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Asako, Tsunehiko; and Yoshioka, Kouichi, 4,020,269.

Old Fort International, Inc.: *See—*
Balhorn, Milo G., 4,019,848.

Oldford, William G. Electrical measuring system for testing electrical components. 4,020,243, Cl. 429-93.000.

Olin Corporation: *See—*
Raghavan, Mathur; and Shapiro, Eugene, 4,019,900.

Olson, Bradford A.: *See—*
Weaver, Gerald Q.; and Olson, Bradford A., 4,019,913.

O'Mahoney, Joseph F., Jr., to Goodyear Tire & Rubber Company, The. Paintable rubber composition and products prepared therefrom. 4,020,038, Cl. 260-42.330.

Omark Industries, Inc.: *See—*
Penberthy, Robert J., 4,019,407.

Omnium de Prospective Industrielle, S.A.: *See—*
Saby, Carnot E. A. R., 4,019,956.

Omori, Yoshitaka: *See—*
Tsukahara, Takeshi; Morioka, Minoru; Oguma, Yoichi; and Omori, Yoshitaka, 4,019,774.

Onions, Allan: *See—*
Golightly, David Stainsley; and Onions, Allan, 4,019,916.

Ono, Hiroyuki: *See—*
Kondo, Takeo; Hyodo, Yoichi; Ono, Hiroyuki; and Yuasa, Shiro, 4,019,403.

Ono, Hitoshi: *See—*
Mizutani, Hiroshi; and Ono, Hitoshi, 4,019,351.

Oppermann, Horst: *See—*
Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, 4,019,958.

OPT Industries, Inc.: *See—*
Potash, Jerome, 4,020,394.

Orgill, Rodney H.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.

Oronzio de Nora Impianti Elettrochimici S.p.A.: *See—*
Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido, 4,020,235.

Ortho Pharmaceutical Corporation: *See—*
Asculai, Samuel Simon; Kupferberg, Alfred B., deceased; Kupferberg, Beatrice, coexecutrix; and Halpern, Meyer, coexecutor, 4,020,183.

Osaka University: *See—*
Nenno, Soji; and Enami, Kazuyuki, 4,019,925.

Osawa, Sadao: *See—*
Tamai, Yasuo; Osawa, Sadao, and Honjo, Satoru, 4,019,993.

Oshiro, Seiri. Window with ventilating capability. 4,019,555, Cl. 160-371.000.

Osipow, Lloyd I.: *See—*
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 4,019,657.

Osman, Lloyd Carl, to AMP Incorporated. Crimping press clamp for electrical connectors. 4,019,236, Cl. 29-753.000.

Ostrander, George K.: *See—*
Wixson, Donald F.; and Ostrander, George K., 4,019,567.

Oswald, Roger Derek, to BOC Limited. Electric heaters. 4,020,321, Cl. 219-271.000.

Otake, Tsutomu; Takeshita, Hiroshi; Kouchi, Akihiko; and Inoue, Kunihiro, to Kabushiki Kaisha Suwa Seikosha. Electrochromic display device. 4,019,809, Cl. 350-160.00R.

Ottos, James Gunard, to RCA Corporation. Method of detecting heater resistance independent of contact resistance. 4,020,416, Cl. 324-64.000.

Ovard, John C. Splash bar for cooling tower fill assembly. 4,020,130, Cl. 261-111.000.

Overton, Delbert L. Duel fuel system for internal combustion engine. 4,019,477, Cl. 123-127.000.

Ovutime, Inc.: *See—*
Kopito, Louis; and Schuster, Samuel R., 4,019,820.

Owatonna Tool Company: *See—*
Jirele, James E., 4,019,233.

Owen, A. B.; and Gifford, Bruce M., to Lamons Metal Gasket Company. Spiral wound gasket assembly method. 4 019,244, Cl. 29-520.000.

Owens-Illinois, Inc.: *See—*
Ringlien, James A., 4,019,795.
Zielinski, Eugene J., 4,019,798.

Ozawa, Goro; Kosaka, Kenzo; Sato, Kasumi; Ishikawa, Akio; Nanbu, Toshiyuki; Adachi, Kiyoshi; Okaya, Tsutomu; Goto, Takashi; and Kitagawa, Hiroshi, to Mitsubishi Rayon Co., Ltd. Crimping apparatus. 4,019,228, Cl. 28-1.300.

Ozutsumi, Minoru: *See—*
Tsunoda, Takahiro; Ozutsumi, Minoru; Maeda, Shigeo; Suzuka, Susumu; Komiya, Hidetoshi; and Shinohara, Hideaki, 4,019,907.

P. R. Mallory & Co., Inc.: *See—*
Schlaikjer, Carl R., 4,020,240.

Paccar Inc.: *See—*
Magnuson, Roland A., 4,019,422.

Packaging Corporation of America: *See—*
Giannini, Nunzio E., 4,019,672.

Page Belting Company Incorporated: *See—*
Arsenault, Joseph A., 4,019,542.

Palac, Kazimir; and Stachniak, Raymond M., to Zenith Radio Corporation. Photographic master for use in screening a color cathode ray tube. 4,020,493, Cl. 354-1.000.

Palenschat, Dieter: *See—*
Rahtz, Dieter; Schroder, Eberhard; Horowski, Reinhard; Paschelke, Gert; Palenschat, Dieter; Wachtel, Helmut; and Kehr, Wolfgang, 4,020,164.

Palfalvy, Paul. Bird feeder, water and bath hanging support. 4,019,462, Cl. 119-51.500.

Palma, Florencio Neto. Water sprinkler operated by regularly varying water pressure. 4,019,686, Cl. 239-205.000.

Paluch, Stanislawa: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Pancoe, Edward G., to Singer Company, The. Motion system for a flight simulator. 4,019,261, Cl. 35-12.00P.

Papenfuhs, Theodor: *See—*
Hahnke, Manfred; Papenfuhs, Theodor; and Teige, Wolfgang, 4,020,037.

Paredes, Alfredo E., to Konar Corporation. Plural comparator indicator of battery voltage. 4,020,414, Cl. 324-29.500.

Parekh, Manher: *See—*
Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., 4,020,010.

Parel Societe Anonyme: *See—*
Spaziante, Placido M.; and Traini, Carlo, 4,019,968.

Park, Anthony John, to British Petroleum Company Limited, The. Removal of residual monomer in the presence of water by dielectric heating. 4,020,267, Cl. 528-503.000.

Parkell, Erwin C.; and Stamm, John A., to Du Pont de Nemours, E. I., and Company. Chromatographic detector system. 4,019,372, Cl. 73-61.10C.

Parker, Earl E.: *See—*
Wismer, Marco; and Parker, Earl E., 4,020,193.

Parker, James A.: *See—*
Dix, Robert; Markel, Richard F.; Parker, James A.; Riggs, John P.; and Vest, Dale T., 4,020,273.

Parker, James E., to ICL/Scientific. Fluid containing dispersed particles simulating leukocytes and method for producing same. 4,020,006, Cl. 252-408.000.

Parker, John F.: *See—*
Bassett, Henry C.; From, Charles A., Jr.; Parker, John F.; and Worley, Ansel A., 4,019,250.

Parkes, Colin Walter: *See—*
Groszek, Aleksander Jerzy; Parkes, Colin Walter; and Crump, Ronald Alfred, 4,020,200.

Parkin, Charles Stephen, to Ciba-Geigy Corporation. Atomizer. 4,019,684, Cl. 239-145.000.

Pars, Harry George: *See—*
Harris, Louis Selig; Pars, Harry George; Razdan, Raj Kumar; Sheehan, John Clark; and Terris, Barbara Zitko, 4,020,163.

Partenheimer, Walter, to Standard Oil Company (Indiana). Reactivation of maleic anhydride producing phosphorus-vanadium-oxygen complex oxidation catalysts by treatment with halide containing materials. 4,020,174, Cl. 260-346.80A.

Paschelke, Gert: *See—*
Rahtz, Dieter; Schroder, Eberhard; Horowski, Reinhard; Paschelke, Gert; Palenschat, Dieter; Wachtel, Helmut; and Kehr, Wolfgang, 4,020,164.

Pasquini, Ari: *See—*
Beger, Udo; Saillard, Gabriel; and Pasquini, Ari, 4,019,757.

Passmore, Edmund M.: *See—*
Labadini, William M.; Passmore, Edmund M.; and Anderson, Warren A., 4,020,383.

Pastoriza, James J., to Analog Devices, Inc. Solid state digital-to-analog converter. 4,020,486, Cl. 340-347.0DA.

Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH: *See—*
Popp, Hanns-Peter; and Pilz, Walter, 4,020,377.

Patentkommerz AG: *See—*
Krautkramer, Gunter, 4,019,663.

Patrick, Charles T., Jr.; and King, David W., to NDM Corporation. Sponge retaining cup for medical electrode. 4,019,500, Cl. 128-2.10E.

Patterson, Hubert A.: *See—*
Elder, James H.; and Patterson, Hubert A., 4,020,421.

Patterson, Richard G.; and Fuller, Thaddeus W., to Muskin Corporation. Water-inflated portable spa. 4,019,210, Cl. 4-172.000.

Patton, Eugene K.: *See—*
Zook, Donald G.; Miller, Kenneth J.; and Patton, Eugene K., 4,019,242.

Patton, John T., Jr.: *See—*
Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., 4,020,010.

Paulsen, Henry C.: *See—*
Holman, Harry A.; Kallmeyer, Albert W.; Paulsen, Henry C.; and Weaver, William W., 4,019,540.

Pawlikowski, Stanley L.; and Penird, Carl W., to GTE Sylvania Incorporated. CRT screen exposure device having improved optical alignment. 4,020,494, Cl. 354-1.000.

Pawlowski, Tadeusz: *See—*
Wroclawski, Zbigniew; Kedzia, Stanislaw; and Pawlowski, Tadeusz, 4,019,691.

PDI, Inc.: *See—*
Gorbunow, Walter, 4,020,029.

Pearce, Leonard John: *See—*
Birt, Dennis Courtney Parsons; Holland, Ronald; and Pearce, Leonard John, 4,020,247.

Peddle, Charles I.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.

Pedro, Enrique. Rotary structure for the support of loads. 4,019,292, Cl. 52-65.000.

Peel, Richard Philip; and Sutherland, James Kenneth, to Imperial Chemical Industries Limited. Lactone aldehydes. 4,020,172, Cl. 260-343.20R.

Peer, Hendricus Gerardus: *See—*
van den Ouweland, Godefridus Antonius Maria; and Peer, Hendricus Gerardus, 4,020,170.

Penberthy, Robert J., to Omark Industries, Inc. Saw chain grinder fixture. 4,019,407, Cl. 76-37.000.

Penird, Carl W.: *See—*
Pawlikowski, Stanley L.; and Penird, Carl W., 4,020,494.

Pennwalt Corporation: *See—*
Huber, Ludwig Konrad, 4,019,891.

Percy, Vernon L. Positive ring retaining system. 4,019,824, Cl. 403-261.000.

Perez, George R., to AMF Incorporated. Releasable connector having improved load carrying and releasing capability. 4,019,771, Cl. 294-83.00R.

Perla, Giulio; Mannara, Giuseppe; and Milesi, Domenico, to Colgate-Palmolive Company. Manufacture of gas-free dentifrice. 4,020,154, Cl. 424-49.000.

Perna, Aldo; and Springolo, Manlio, to Societa Italiana Telecomunicazioni Siemens S.p.A. Signalization coordinator for PCM switching system. 4,020,290, Cl. 179-15.0AT.

Perronnet, Jacques; and Taliani, Laurent, to Roussel-UCLAF. Novel phosphoryloxy-thiazoles. 4,020,076, Cl. 260-302.00E.

Perry, David L.: *See—*
Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., 4,019,600.

Perry, Eugene Norman: *See—*
Li, Yi-Sheng; Leon, Rudolph Cesar, Sr.; and Perry, Eugene Norman, 4,019,509.

Personal Products Company: *See—*
Chatterjee, Pronoy Kumar, 4,020,271.

Peschke, Gunter: *See—*
Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, 4,019,958.

Peshock, Michael, Jr.: *See—*
Oess, Frederick G.; and Peshock, Michael, Jr., 4,020,381.

Peters, Petrus: *See—*
Bolt, Barry; and Peters, Petrus, 4,020,382.

Peterson, Dean M.; and Wittenberger, John C., to Honeywell Inc. Support for components of an automatic focusing system. 4,020,496, Cl. 354-25.000.

Petro-Tex Chemical Corporation: *See—*
Christmann, Harold F.; and Miklas, Edward J., 4,020,120.

Petterson, Eric Sigfried: *See—*
Barrett, Michael Conan; and Petterson, Eric Sigfried, 4,020,506.

Peytavin, Pierre, to Vallourec. Drive device for clamp holder carriages of a continuously operating pilger mill. 4,019,394, Cl. 74-27.000.

Pfefferle, William C., to Engelhard Minerals & Chemicals Corporation. Method of starting a combustion system utilizing a catalyst. 4,019,316, Cl. 60-39.020.

Pfost, Robert Fred; and Elkus, Eugene S., to Service Distributors, Inc. Magnetic card substitute for coins for starting appliances and the like. 4,020,325, Cl. 235-61.70B.

Philip, Morris. Method and apparatus for selectively rendering needles operative and inoperative on a circular knitting machine. 4,019,348, Cl. 66-24.000.

Philip Morris Incorporated: *See—*
Briskin, Theodore S., 4,019,521.
Claflin, Warren E.; and Watson, Francis M., III, 4,019,366.
Kay, James A., Jr., 4,019,942.

Phillips, David C.: *See—*
Gass, William R.; Scala, Luciano C.; and Phillips, David C., 4,019,877.

Phillips Petroleum Company: *See—*
Erickson, Wayne K., 4,020,212.
Farrar, Ralph C., 4,020,258.
Fodor, Lawrence M., 4,020,054.
Fozzard, George B., 4,019,965.
Hsieh, Henry L., 4,020,018.
Hsieh, Henry L., 4,020,251.

Johnson, Marvin M.; Tabler, Donald C.; and Nowack, Gerhard P., 4,020,119.
Merrill, R. F., 4,020,031.
Naylor, Floyd E., 4,020,007.
Naylor, Floyd E., 4,020,008.
South, Aubrey, Jr., 4,020,036.
Vinatieri, James E., 4,019,545.
Whitson, Bobbie L.; and Morgan, John A., 4,019,524.

Phillips, William W., to Shaymar, Inc. Speaker system. 4,020,284, Cl. 179-1.00E.

Phone-Ducs, Inc.: *See—*
Streit, Kenneth F., 4,019,760.

Pickwell, Robert J.: *See—*
Ranney, Maurice W.; and Pickwell, Robert J., 4,020,218.

Pijls, Hermanus Stephanus Josephus; and Put, Elias, to U.S. Philips Corporation. Short-circuit arc welding with constant beads. 4,020,320, Cl. 219-137.0PS.

Pilgram, Kurt H. G., to Shell Oil Company. Herbicidal heterocyclic compounds. 4,019,892, Cl. 71-88.000.

Pilkington Brothers Limited: *See—*
Kirkbride, Bernard James; Downey, Robert Andrew; Thomasson, Charles Victor; and Lewis, Joseph Earle, 4,019,887.

Pilz, Walter: *See—*
Popp, Hanns-Peter; and Pilz, Walter, 4,020,377.

Pisatowski, Albert J.: *See—*
Caputo, William R.; and Pisatowski, Albert J., 4,019,606.

Pisio, Peter; and Kirkvold, Charles F., to Chevron Research Company. System for recovering viscous petroleum from thick tar sand. 4,019,575, Cl. 166-61.000.

Pitney-Bowes, Inc.: *See—*
Marin, M. James; and Mersereau, Robert E., 4,019,640.
Staudinger, Frederick J.; and Montagnino, James G., 4,019,730.
Vijayendran, Bheema R.; and DuBois, R. Clark, 4,019,911.

Pittway Corporation: *See—*
Conforti, Frederick J.; and Ogden, Wilbur L., 4,020,479.

Pizur, Stephen J., Sr. Multiple bingo game apparatus. 4,019,744, Cl. 273-135.00B.

Plastic Chemical Development Co.: *See—*
Budnick, Edward G., 4,020,091.

Plaisted, Anthony Cecil, to Fosroc A.G. Cartridge containing a self-setting composition. 4,019,630, Cl. 206-219.000.

Planatolwerk Willy Hesselmann: *See—*
Wetzler, Josef; Gaschler, August; and Hofmann, Heinz, 4,019,457.

Plant, Howard L.; and Bell, Allyn Roy, to Uniroyal Inc. Herbicidal method using 2-sulfinyl or 2-sulfonyl pyridine N-oxide derivatives. 4,019,893, Cl. 71-94.000.

Ploetz, Theodor, deceased; by Hasse, Adelbert, administrator; and Franzen, Volker, to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung. Method of purifying the waste water of paper mills. 4,019,952, Cl. 162-29.000.

Plos, Lorenzo: *See—*
Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, 4,020,501.

Podvin, Richard T.: *See—*
Look, Thomas F.; Podvin, Richard T.; and Weigel, Carlyle A., 4,019,945.

Poelma, Cornelis Frederikus; Horowitz, Alexandre; and Verschure, Petrus Joseph Marie, to Varitrac A.G. Hoisting hook assembly and method for hoisting a load. 4,019,770, Cl. 294-78.00R.

Pohl, Andreas: *See—*
Keller, Guenter; Klinger, Friedrich; Pohl, Andreas; Schimanski, Gerhard; and Zuber, Guenter, 4,019,378.

Polanski, Alfred: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Polaroid Corporation: *See—*
Friedman, Harvey S., 4,020,498.
Greenwald, Richard B., 4,020,176.
McCole, Thomas P., 4,019,251.
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.

Pollard, Melville R. Reciprocating powered bicycle. 4,019,230, Cl. 280-214.000.

Polysar Limited: *See—*
Dunn, John Robert; and Coulthard, Douglas Currie, 4,020,039.

Popp, Hanns-Peter; and Pilz, Walter, to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH. High pressure mercury vapor discharge lamp. 4,020,377, Cl. 313-112.000.

Port, Werner; and Schmieder, Christian, to Braun Aktiengesellschaft. Electric shaver. 4,019,252, Cl. 30-43.920.

Porter, Donald H., to Estey Dynamics Corporation. Electrogasdynamic coating device having composite non-conductive flow channel, and hollow ionization electrode for an air jet. 4,020,393, Cl. 361-227.000.

Potash, Jerome, to OPT Industries, Inc. Ground fault detector. 4,020,394, Cl. 361-45.000.

Poteet, Everett E. Heating and cooling system. 4,019,338, Cl. 62-238.000.

Powell, James E.: *See—*
Roman, Steven A.; and Powell, James E., 4,020,061.

Powell, Noble R.; and Irwin, John M., to General Electric Company. Integrated arithmetic unit for computing summed indexed products. 4,020,334, Cl. 235-164.000.

PPG Industries, Inc.: *See—*
Schimmel, Karl F.; and Wismer, Marco, 4,020,050.
Wismer, Marco; and Parker, Earl E., 4,020,193.

Praml, Henry W. System including household connector plug for split wire receptacle. 4,019,797, Cl. 339-14.00P.

Pratt, George W., Jr., to Massachusetts Institute of Technology. Discharge device. 4,020,388, Cl. 315-58.000.

Prenzel, Karl; and Dittner, Adam, to Frieseke & Hoepfner GmbH Erlangen-Bruck. Vehicle electronic clutch control. 4,019,614, Cl. 192-103.00F.

Priesemuth, Wolfgang. Windshield wiper. 4,019,216, Cl. 15-250.030.

Primault, Andre, to Societe Generale de Fonderie. Method for enamelling the edges of sanitary articles. 4,020,195, Cl. 427-193.000.

Prince, Eric Victor Donald; Lewis, Kenneth Llewellyn; and Ralph, Leonard John Michael, to Dunlop Australia Limited. Method of constructing conveyor belting. 4,019,941, Cl. 156-179.000.

Printronix, Inc.: *See—*
Emenaker, Leo J., 4,019,619.

Procter & Gamble Company, The: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,019,998.
Evans, Stephen F., 4,019,306.
Ohren, Tom H.; and Kingry, Gary W., 4,019,999.

Produits Chimiques Ugine Kuhlmann: *See—*
Breda, Antoine Georges Leon Jacques, 4,019,857.
Mahe, Jean, 4,019,923.

Proulx, Arthur Z., to Minnesota Mining and Manufacturing Company. Automatic magnetic record sheet copying apparatus. 4,020,504, Cl. 360-17.000.

Pruitt, Laurie E.: *See—*
Dickson, Arthur D.; and Pruitt, Laurie E., 4,020,389.

Pruzansky, Jacob: *See—*
Steinberg, Meyer; Colombo, Peter; and Pruzansky, Jacob, 4,020,003.

Pryor, Michael J.: *See—*
Setzer, William C.; Cheskis, Harvey P.; and Pryor, Michael J., 4,019,931.

Puech, Claude: *See—*
Carre, Bernard; Puech, Claude; and Spitz, Erich, 4,020,278.

Pugi, Kalev: *See—*
Jaswal, Iqbalsingh; and Pugi, Kalev, 4,019,866.

Pugliese, Rocco. Fuel separator. 4,019,482, Cl. 123-141.000.

Pullukat, Thomas J., to Chemplex Company. Compounds bis(tributyltin)chromate and bis(triphenyltin)chromate. 4,020,092, Cl. 260-429.700.

Puls, Walter: *See—*
Frommer, Werner; Puls, Walter; and Schmidt, Delf, 4,019,960.

Punis, Giancarlo, to Metrologic Instruments, Inc. Signal processing for print scanners. 4,020,357, Cl. 250-568.000.

Put, Elias: *See—*
Pijls, Hermanus Stephanus Josephus; and Put, Elias, 4,020,320.

Puttock, Michael A.: *See—*
Graham, Bruce A.; Puttock, Michael A.; Felauer, Ethel E.; and Neidermyer, Robert W., 4,020,168.

Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, to BASF Aktiengesellschaft. Production of 2-hydroxynaphthalene-3-carboxylic acid. 4,020,102, Cl. 260-520.00A.

Quadrini, John A.: *See—*
Kosson, Robert L.; and Quadrini, John A., 4,019,571.

Quaker Oats Company, The: *See—*
Brindell, Gordon D.; and Macander, Rudy F., 4,020,113.

Quick, Donald J., to Massey-Ferguson Services N.V. Base cutting apparatus for sugar cane harvesters. 4,019,308, Cl. 56-13.900.

Quidort, Vaughn L.: *See—*
Fasulkey, Robert H.; and Quidort, Vaughn L., 4,020,397.

Quinn, David G.; and Rauschenberger, Richard A., to Will Ross, Inc. Device for supporting fluid receptacles. 4,019,707, Cl. 248-95.000.

Quinn, James Maurice; and Kirk, Allen Gregg, to Du Pont de Nemours, E. I., and Company. Method of making heat-sealable, heat-shrinkable, biaxially oriented polyester film. 4,020,141, Cl. 264-289.000.

Raabe, Thomas; Grawinger, Otto; Scholtholt, Josef; Nitz, Rolf-Eberhard; and Schraven, Eckhard, to Cassella Farbwerke Mainkur Aktiengesellschaft. Derivatives of 1-phenoxy-3-amino-propan-2-ol. 4,020,071, Cl. 260-256.40R.

Rabin, Melvin G.: *See—*
Kenkelen, Charles W., 4,019,277.

Rabiner, Lawrence Richard: *See—*
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Rabo, Jule Anthony, Francis, James Nelson; and Angell, Charles Leslie, to Union Carbide Corporation. Selective adsorption of carbon monoxide from gas streams. 4,019,879, Cl. 55-68.000.

Rabo, Jule Anthony; Francis, James Nelson; and Angell, Charles Leslie, to Union Carbide Corporation. Adsorption of carbon monoxide using silver zeolites. 4,019,880, Cl. 55-68.000.

Radahl, Rolf: *See—*
Natvik, Rolf; and Radahl, Rolf, 4,019,973.

Radt, Walter: *See—*
Geffers, Hans; Radt, Walter; Schliebs, Reinhard; and Schulz, Hartmut, 4,020,101.

Raffaelli, Joseph G.: *See—*
Carlson, Elmer A.; Raffaelli, Joseph G.; and Gann, Ronald A., 4,019,854.

Raghavan, Mathur; and Shapiro, Eugene, to Olin Corporation. High strength oxidation resistant nickel base alloys. 4,019,900, Cl. 75-171.000.

Rahtz, Dieter; Schroder, Eberhard; Horowski, Reinhard; Paschelke, Gert; Palenschat, Dieter; Wachtel, Helmut; and Kehr, Wolfgang, to Schering Aktiengesellschaft. Benzomorphan derivatives. 4,020,164, Cl. 424-267.000.

Ralph, Leonard John Michael: *See—*
Prince, Eric Victor Donald; Lewis, Kenneth Llewellyn; and Ralph, Leonard John Michael, 4,019,941.

Rank Organisation Limited, The: *See—*
Garner, Alex Victor; and Townsend, Graham, 4,020,299.

Ranney, Maurice W.; and Pickwell, Robert J., to Union Carbide Corporation. Polysulfide sealant and caulk compositions. 4,020,218, Cl. 428-447.000.

Raphael's Limited: *See—*
Gravell, George William, 4,019,285.

Rapifax Corporation: *See—*
Lorah, Lawrence D.; Stresau, Richard W.; Lapson, Lawrence B.; and van Vloten, Curtis P., 4,019,811.

Rasmussen, Max Otto Henri. Thermal insulating curtain, especially for use in greenhouses. 4,019,554, Cl. 160-84.00R.

Rathgeb, Paul, to Ciba-Geigy Corporation. 1,3,4-Thiadiazolyl-(2)-hexahydro-triazinones. 4,020,065, Cl. 260-248.0NS.

Rauschenberger, Richard A.: *See—*
Quinn, David G.; and Rauschenberger, Richard A., 4,019,707.

Ravenhall, Richard: *See—*
Salemme, Charles T.; Ravenhall, Richard; and Harris, David J., 4,019,832.

Ray, Louis M. Hydraulic hoist for pickup bed. 4,019,781, Cl. 298-22.00J.

Ray, Richard E.; and Wagner, Hans A., to G. D. Searle & Co. Anti-inflammatory sydnones. 4,020,079, Cl. 260-307.00A.

Ray, Roger E.: *See—*
Gambale, John C.; and Ray, Roger E., 4,020,396.

Raymond Lee Organization, Inc., The: *See—*
Chandroga, Issabhai I., 4,019,530.
D'Auria, Rosemarie, 4,019,516.
O'Dell, Marvin, 4,019,354.
Richards, John A., 4,020,384.
Turner, Lester Willis, 4,019,726.
Wetherbee, Edward P., 4,020,413.
Willenborg, Robert A., 4,019,219.

Raymond, Samuel O., to Benthos, Inc. Underwater sampler. 4,019,380, Cl. 73-170.00A.

Razdan, Raj Kumar: *See—*
Harris, Louis Selig; Pars, Harry George; Razdan, Raj Kumar; Sheehan, John Clark; and Terris, Barbara Zitko, 4,020,163.

RCA Corporation: *See—*
Harwood, Leopold Albert, 4,020,500.
Ottos, James Gunard, 4,020,416.
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Vilkomerson, David Herman Raphael, 4,019,818.

Reading Door Closer Corporation: *See—*
Lieberman, Sidney, 4,019,220.

Rechsteiner, Hugo: *See—*
Jaggi, Hans; Lehmann, Ernesto; and Rechsteiner, Hugo, 4,019,544.

Recognition Equipment Incorporated: *See—*
Himmel, David P., 4,020,463.

Redgate, Theodore: *See—*
Erickson, John M.; and Redgate, Theodore, 4,020,395.

Redinger, Ira H., Jr.; Sadowsky, David; and Stripinis, Philip S., to United Technologies Corporation. External gas turbine engine cooling for clearance control. 4,019,320, Cl. 60-226.00R.

Reed, Robert D., to John Zink Company. Apparatus for radiant heat transfer. 4,019,466, Cl. 122-367.00R.

Reese, Cleve L.: *See—*
Edwards, Stanley H., Jr.; and Reese, Cleve L., 4,020,308.

Reese, Paul T., to Tecumseh Products Company. Pull-rope recoil starter. 4,019,490, Cl. 123-185.00A.

Regan, John William; and Rode, Douglas Michael, to Air Preheater Company, Inc., The. Furnace design for pulverized coal and stoker firing. 4,019,465, Cl. 122-240.00A.

Reid, Robert A., to CPC Engineering Corporation. Cone pump. 4,019,830, Cl. 415-72.000.

Reinshagen, Hellmuth: *See—*
Nesvadba, Hans; and Reinshagen, Hellmuth, 4,020,166.

Reiter, Norbert, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Coated hard metal body. 4,019,873, Cl. 428-217.000.

Relles, Howard M.: *See—*
Johnson, Donald S.; and Relles, Howard M., 4,020,069.

Remes, Miroslav; Matrka, Miroslav; and Sagner, Zdenek, to Vyzkumny ustav organickych syntex. Method of amperometric determination of the concentration of arendiazonium salts. 4,019,966, Cl. 204-1.00T.

Remy, David C.; and Freedman, Mark B., to Merck & Co., Inc. Process for preparing aryl trifluoromethylsulfides. 4,020,169, Cl. 260-328.000.

Rengo Kabushiki Kaisha: *See—*
Tokuno, Masateru; Matsuura, Masayuki; Shinmura, Noboru; and Kaneko, Masayoshi, 4,020,406.

Reppert, Merlyn R., to W. R. Grace & Co. Automotive wire wheel and manufacturing method. 4,019,782, Cl. 301-58.000.

Rescalli, Carlo; and Ginnasi, Alessandro, to Snam Progetti S.p.A. Process for separating butadiene from C_4 hydrocarbons streams obtained by stream-cracking. 4,020,114, Cl. 260-681.50R.

Research Development Systems, Inc.: *See—*
Der Estephanian, Estephan; Foreman, Robert E.; Scott, Robert D.; and Friis, Odd, 4,019,508.

Ret, Luigi: *See—*
Hillberger, Horst; Masili, Dino; Plos, Lorenzo; and Ret, Luigi, 4,020,501.

Reuter, Martin: *See—*
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Rexnord Inc.: *See—*
Eggert, Glenn J.; and Lee, Phillip L., 4,019,627.

Reynard, Remi: *See—*
Hoffmann, Daniel; and Reynard, Remi, 4,019,539.

Reynolds, George L., to United States of America, Army. Cartridge soft feed mechanism with magazine interrupter. 4,019,424, Cl. 89-137.000.

Rheinisch-Westfalisches-Elektrizitatswerk Aktiengesellschaft: *See—*
Fritz, Heinz Peter; Wabner, Dietrich; and Huss, Rainer, 4,019,970.

Rhoades-Brown, John Ernest: *See—*
Lloyd, Geoffrey Oliver; Rhoades-Brown, John Ernest; and Saunders, Stuart Richard John, 4,019,926.

Rhone-Poulenc Industries: *See—*
Jay, Pierre; and Schwachhofer, Ghislain, 4,019,996.

Rhone-Poulenc-Textile: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,020,196.

Richards, John A., to Raymond Lee Organization, Inc., The, a part interest. Linear particle accelerator. 4,020,384, Cl. 313-359.000.

Richardson Chemical Company, The: *See—*
Mallory, Glenn O., Jr., 4,019,910.

Richardson, John: *See—*
Lee, Wayne; and Richardson, John, 4,019,734.

Richardson-Merrell Inc.: *See—*
Erickson, Raymond C.; and Bambury, Ronald E., 4,020,060.
Irvine, John L., 4,020,179.

Richmond Industries, Inc.: *See—*
Allmendinger, Norbert, 4,019,584.

Richter, Reinhard H., to Upjohn Company, The. Process for isomerizing cis,cis- and cis,trans-isomers of di-(p-aminocyclohexyl)methane to the corresponding trans,trans-isomer. 4,020,104, Cl. 260-563.00B.

Rickards, Michael A., to Rohr Industries, Inc. Elastomer strain gage. 4,019,377, Cl. 73-88.50R.

Ricoh Co., Ltd.: *See—*
Imamura, Masanaga, 4,019,646.

Ridgway, John A., Jr.: *See—*
Allen, Richard L.; Benjamin, Benny M.; Lappin, Terry A.; Ridgway, John A., Jr.; and Saunders, Elmer J., 4,019,962.

Ridley, Kenneth Arthur, to Ciba-Geigy AG. Curtain coating method. 4,019,906, Cl. 96-68.000.

Rieter Machine Works, Ltd.: *See—*
Gujer Peter; and Wust, Olivier, 4,019,690.

Riggs, John P.: *See—*
Dix, Robert; Markel, Richard F.; Parker, James A.; Riggs, John P.; and Vest, Dale T., 4,020,273.

Rinehart, Verne R., to Goodyear Tire & Rubber Company, The. Process for preparing polyester resin. 4,020,049, Cl. 260-75.00M.

Ringlien, James A., to Owens-Illinois, Inc. Passive alignment of laser mirrors. 4,019,795, Cl. 316-1.000.

Rioux, Christian; and Legentil, Michel, to Agence Nationale de Valorisation de la Recherche (ANVAR). High-efficiency transfer of magnetic energy. 4,020,412, Cl. 323-43.50R.

Rite Autotronics Corporation: *See—*
Schwartz, Edwin L., 4,020,305.

Ritsema, Irving R., to Bendix Corporation, The. Disc brake. 4,019,611, Cl. 188-73.300.

Ritter, Arthur J., Jr.: *See—*
Master, Ralph E.; Ritter, Arthur J., Jr.; and Perry, David L., 4,019,600.

Ritter, Gerhard: *See—*
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 4,019,665.

Ritter, Josef: *See—*
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 4,019,665.

Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, to Evg Entwicklungs-u Verwertungsgesellschaft, Firma. Feed device for rod or striplike material. 4,019,665, Cl. 226-112.000.

Robert Bosch G.m.b.H.: *See—*
Esper, Friedrich; and Bethge, Karin, 4,019,914.
Issler, Jorg; and Gerber, Richard, 4,019,796.
Linder, Ernst, 4,020,336.
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Weyl, Helmut; and Steinke, Leo, 4,019,974.

Robert Krause KG: *See—*
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Roberts, Edward S. Refrigeration system using enthalpy converting liquid turbines. 4,019,343, Cl. 62-510.000.

Robertson, Boyd C., Jr.: *See—*
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Robertson, Thomas: *See—*
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Roblin Industries, Inc.: *See—*
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Robugen GmbH: *See—*
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Rock, John A.: *See—*
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Rockefeller, Winston G.: *See—*
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Rockwell International Corporation: *See—*
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Rockwell-Rimoldi S.p.A.: *See—*
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Rod, Josef: *See—*
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Rode, Douglas Michael: *See—*
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Rodemann, Alfred H.: *See—*
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MacKay, Kenneth D.; and Rogier, Edgar R., 4,020,081.
Rohm and Haas Company: *See—*
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Martorano, Richard; Brendley, William H., Jr.; and Haag, Thomas H., 4,020,219.
Rohr Industries, Inc.: *See—*
Rickards, Michael A., 4,019,377.
Rohr, Robert Lewis: *See—*
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Roll-O-Matic Chain Company: *See—*
Lee, Earnest M.; and Clyma, Grady L., 4,019,442.
Rolls-Royce (1971) Limited: *See—*
Gale, Anthony George, 4,019,833.
Rom, Josef; Alterman, Israel; and Schwartz, Joseph, to Technion Research and Development Foundation Ltd.; and Alterman, Israel, part interest to each. Formation of load-bearing foundations by laser-beam irradiation of the soil. 4,019,331, Cl. 61-53.540.
Roman, Steven A.; and Powell, James E., to Shell Oil Company. 3-Oxomethyl-2-(1-nitro-2-oxoethylidene)-tetrahydro-2H-1,3-thiazines. 4,020,061, Cl. 260-243.00R.
Roos, Leo: *See—*
Cohen, Abraham Bernard; and Roos, Leo, 4,019,909.
Rose, Dennis L.: *See—*
Lavin, Walter M.; McFarlane, James I.; and Rose, Dennis L., 4,019,859.
Rose, John Brewster: *See—*
King, Terence; and Rose, John Brewster, 4,020,046.
Rosin, Walter M.; VanDerMeulen, Douglas J.; and Frost, Charles C., to C. L. Frost & Son, Inc. Trolley wheel. 4,019,789, Cl. 308-190.000.
Ross, Edward E., to Del Monte Corporation. Can filling method and apparatus. 4,019,547, Cl. 141-11.000.
Ross, Roger Allen; and Strachan, Donald Rittler, to Du Pont de Nemours, E. I., and Company. Process for melt spinning a plurality of eccentric sheath-core filaments. 4,020,139, Cl. 264-171.000.
Roszinski, Hilmar; Lippsmeier, Bernd; and Hartlapp, Gerhard, to Hoechst Aktiengesellschaft. Production of dithiophosphoric acid-O,O-diesters. 4,020,129, Cl. 260-983.000.
Roth, Nathan, to Alza Corporation. Cartoned medical instrument package. 4,019,633, Cl. 206-364.000.
Rotraco Systems Limited: *See—*
Tate, Walter; and Robertson, Thomas, 4,020,359.
Rouse, John W., to American Can Company. Can end feed mechanism. 4,019,452, Cl. 113-114.0BE.
Roussel-UCLAF: *See—*
Perronnet, Jacques; and Taliani, Laurent, 4,020,076.
Rowe, Richard A., to General Electric Company. Roller for dishwasher rack. 4,019,794, Cl. 312-311.000.
Rowsell, David G.; and Spring, David J., to Wilkinson Sword Limited. Cyclic sulphonamides and sulphinamides having a physiological cooling effect. 4,020,153, Cl. 424-49.000.
Rozema, Arthur L.: *See—*
Kelver, William L.; Stuckey, Ronald L.; and Rozema, Arthur L., 4,020,445.
Rumball, Kenneth Francis, to Airfix Industries Limited. Method of making a frusto-conical container having reduced distortion tendencies from a blank seamed by injection molding. 4,020,140, Cl. 264-261.000.
Ruppe, George T. Fishing sinker. 4,019,275, Cl. 43-44.960.
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Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.
Rush, Joseph A. Method and apparatus for automatic furnace. 4,019,492, Cl. 126-121.000.
Ryobi, Ltd.: *See—*
Sakuma, Roku, 4,019,263.
S.T. Dupont: *See—*
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Sabol, Alexander P.: *See—*
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Saby, Carnot E. A. R., to Omnium de Prospective Industrielle, S.A. Process for recovering hair by dissolving the skin or hide. 4,019,956, Cl. 195-6.000.
Sadler, Marc, to Dorofix Design Establishment. Ski boot structure. 4,019,267, Cl. 36-120.000.
Sado, Yukio, to Yoshida Kogyo Kabushiki Kaisha. Ventilator. 4,019,429, Cl. 98-37.000.
Sadowsky, David: *See—*
Redinger, Ira H., Jr.; Sadowsky, David; and Stripinis, Philip S., 4,019,320.
Safdari, Yahya B. Solar air heater assembly. 4,019,494, Cl. 126-270.000.
Sagami Chemical Research Center: *See—*
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Tsuchihashi, Genichi; and Ogura, Katsuyuki, 4,020,171.
Sagner, Zdenek: *See—*
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Saidla, Glen E. W.: *See—*
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Ogasawara, Masafumi; Akita, Masanori; Saito, Kazuhiko; Kikuchi, Yoshikazu; and Shiokawa, Mitsuhiro, 4,019,844.
Saito, Syobu; and Sakitani, Yoshio, to Hitachi, Ltd. Sample analysis apparatus using electron beam irradiation. 4,020,353, Cl. 250-441.000.
Saito, Tomo; Watanabe, Kazuo; Nishiyama, Yumiko; and Morikawa, Naotake, to Sagami Chemical Research Center. Method for measuring radioactivities of tritium and carbon-14 in sample air and apparatus for performing the same method. 4,019,864, Cl. 23-253.0PC.
Saito, Yoshifusa: *See—*
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Saito, Syobu; and Sakitani, Yoshio, 4,020,353.
Sakuma, Roku, to Ryobi, Ltd. Card type language teaching apparatus. 4,019,263, Cl. 35-35.00C.
Salemme, Charles T.; Ravenhall, Richard; and Harris, David J., to General Electric Company. Platform for a turbomachinery blade. 4,019,832, Cl. 416-135.000.
Salomons, Arnold, to Gladu A.G. Cardboard box. 4,019,673, Cl. 229-17.00R.
Sanderson, Allan, to Welding Institute, The. Electron beam generators. 4,020,318, Cl. 219-121.0EB.
Sandner, Helmut Gustav, to Du Pont de Nemours, E. I., and Company. Apparatus for toning tack surfaces. 4,019,821, Cl. 401-4.000.
Sandoz, Inc.: *See—*
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Kathawala, Faizulla G., 4,020,083.
Sandoz, Ltd.: *See—*
Nesvadba, Hans; and Reinshagen, Hellmuth, 4,020,166.
Sanford, Philip Horton, to Masoneilan International, Inc. Calibration apparatus and method. 4,019,363, Cl. 73-1.00R.
Sangalli, Sylvio: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,020,196.
Santen, Sven, to SKF Industrial Trading and Development Company, B.V. Method of reducing ore using a plasma burner. 4,019,895, Cl. 75-11.000.
SAPAL Societe Anonyme des Plieuses Automatiques: *See—*
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Sasaki, Kichiro; Takeuchi, Kazuo; Kazitani, Shiro; Shimizu, Kazuo; and Yoshida, Yoshiteru, to Kobe Steel Ltd. Method of fixing an end portion of a line to a reel. 4,019,543, Cl. 140-111.000.
Sasamura, Kohei: *See—*
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Sasayama, Takao: *See—*
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Scheier, Donald J.; and Frederick, Henry E., to Gordon Johnson Company. Poultry eviscerating method and apparatus. 4,019,222, Cl. 17-11.000.

Schell, Mark Samuel, to Du Pont de Nemours, E. I., and Company. Solder substrate clip. 4,019,803, Cl. 339-275.00B.

Scherer, William C.; and Vincent, Raymond A., to Graco Inc. Automatic proportioning paint spray system. 4,019,653, Cl. 222-1.000.

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Schinke, Otto, to Theodor Hymmen KG. Cleaning apparatus for rollers. 4,019,217, Cl. 15-256.530.

Schippers, Heinz, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Process for the production of a multifilament texturized yarn. 4,019,311, Cl. 57-140.0BY.

Schittek, Friedrich, to Gustav F. Gerdts KG. Flap valve. 4,019,532, Cl. 137-527.000.

Schlaikjer, Carl R., to P. R. Mallory & Co., Inc. Electrochemical cell with clovoborate salt in electrolyte and method of operation and composition of matter. 4,020,240, Cl. 429-50.000.

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Schulz, Wallace W.; and Dressen, A. Louise, to United States of America, Energy Research and Development Administration. Conversion of radioactive ferrocyanide compounds to immobile glasses. 4,020,004, Cl. 252-301.10W.

Schulze, Stephen R., to Allied Chemical Corporation. Stress-crack resistant ethylene-perhaloethylene copolymers. 4,020,253, Cl. 526-89.000.

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Sears, Arthur H.; and Siuta, August J., Jr., to Carborundum Company, The. Automatic fuel ignition apparatus. 4,019,853, Cl. 431-67.000.

Sebacher, Daniel I.; and Sabol, Alexander P., to United States of America, National Aeronautics and Space Administration. Solar hydrogen generator. 4,019,868, Cl. 23-281.000.

Sebardt, Carl, to Siftelsen for Metallurgisk Forskning. Manipulator for rolling mill. 4,019,361, Cl. 72-252.000.

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Sekino, Kenro: *See—*
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Siegel, Sidney. Heating and cooling apparatus. 4,019,570, Cl. 165-67.000.
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Siegle, Gert, to Robert Bosch G.m.b.H. Motor ignition system with magnetically selectable gas discharge devices. 4,019,486, Cl. 123-148.00E.
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Smith, Harry D., Jr.; and Schultz, Ward E., to Texaco Inc. Earth formation salinity by comparison of inelastic and capture gamma ray spectra. 4,020,342, Cl. 250-270.000.
Smith, James D. B.; and Kauffman, Robert N., to Westinghouse Electric Corporation. Epoxides containing organo-tin compounds and electrical members insulated therewith. 4,020,017, Cl. 260-2.0EC.
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Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., to Westinghouse Electric Corporation. System and method for complete on line testing of a mechanical overspeed trip channel associated with an electrohydraulic emergency trip system for a turbine power plant. 4,019,390, Cl. 73-432.00R.
Smith, Trevor Stanley, to Lucas Industries Limited. Fluid flow control valve for gas turbine engine fuel control system. 4,019,317, Cl. 60-39.28R.
Smith, Trevor Stanley, to Lucas Industries Limited. Fluid flow control valves. 4,019,318, Cl. 60-39.28R.
Smith, William, to Steel Company of Canada, Limited, The. Method of hot rolling metal strip. 4,019,359, Cl. 72-231.000.
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Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM): *See—*
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Societe Generale de Fonderie: *See—*
Primault, Andre, 4,020,195.
Soehngen, John W.; and Williams, Albert G., to Celanese Corporation. Carbon fiber production. 4,020,145, Cl. 423-447.400.
Soes, Lucas, to AMP Incorporated. Uniplanar electrical contact. 4,019,800, Cl. 339-97.00R.
Sokol, Charles S., to Drackett Company, The. Cleaning compositions effective in dissolving soap curd. 4,020,016, Cl. 252-546.000.
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Wooding, William M. Anticaries agents. 4,020,019, Cl. 260-2.0EN.
Solvay & Cie: *See—*
Walraevens, Rene; and Collin, Andre, 4,020,024.
Sonntag, Hans: *See—*
Derner, Paul; Sonntag, Hans; and Stehl, Otto, 4,019,295.
Sorenson, Paul D.: *See—*
Maurer, Donald D.; and Sorenson, Paul D., 4,019,518.
Souder, James J., Jr.; and Waldorf, Lindsey E. Container for inductively heating food. 4,020,310, Cl. 219-10.490.
South, Aubrey, Jr., to Phillips Petroleum Company. Thermosetting polyester composition containing normally solid carboxy-containing diene polymer. 4,020,036, Cl. 260-40.00R.
Spaziante, Placido: *See—*
Giuffre, Luigi; De Nora, Vittorio; and Spaziante, Placido 4,020,235.
Spaziante, Placido M.; and Traini, Carlo, to Parel Societe Anonyme. Electrochemical cell. 4,019,968, Cl. 204-23.000.
Spears, Cecil Julius. Collapsible tube squeezing device. 4,019,656, Cl. 222-103.000.
Speck, Willis A.: *See—*
Hawkes, George F., Jr.; and Speck, Willis A., 4,020,400.
Spelthahn, Klaus: *See—*
Lachner, Otto; Beyerlein, Ludwig; and Spelthahn, Klaus, 4,020,137.
Spence, Wayman R., to Spenco Medical Corporation. Artificial breast form and method of forming. 4,019,209, Cl. 3-36.000.
Spenco Medical Corporation: *See—*
Spence, Wayman R., 4,019,209.
Sperry Rand Corporation: *See—*
Leinweber, Donald Harder; and Neis, Thomas Walter, 4,020,309.
Levy, Emanuel Edward; and Wolff, Martin Jay, 4,019,260.
Seymour, Shaun A., 4,019,644.
Spies, Johann; and Wohrl, Alfons, to Messerschmitt-Bolkow-Blohm GmbH. Sensing system for actuating a safety device. 4,020,453, Cl. 340-52.00H.
Spitz, Erich: *See—*
Carre, Bernard; Puech, Claude; and Spitz, Erich, 4,020,278.
Spitz, Melvin P. Bedframe with unitized adjustable crossbar. 4,019,211, Cl. 5-181.000.
Spitzer, Joseph George; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C. Aerosol containers for foaming and delivering aerosols. 4,019,657, Cl. 222-136.000.
Spooner, Donald James: *See—*
Hunt, Clayton Edward, Jr.; and Spooner, Donald James, 4,019,732.
Spooner, Robert J.; and Dillon, Oscar W., to Cashin Systems Corporation. Hone for involute knife. 4,019,286, Cl. 51-248.000.
Spring, David J.: *See—*
Rowsell, David G.; and Spring, David J., 4,020,153.
Springmann, Helmut, to Linde Aktiengesellschaft. High pressure gasification of coal using nitrogen dilution of waste gas from steam generator. 4,019,314, Cl. 60-39.020.
Springolo, Manlio: *See—*
Perna, Aldo; and Springolo, Manlio, 4,020,290.
Square D Company: *See—*
Edwards, Stanley H., Jr.; and Reese, Cleve L., 4,020,308.
Stachniak, Raymond M.: *See—*
Palac, Kazimir; and Stachniak, Raymond M., 4,020,493.
Stachowiak, Robert W.: *See—*
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Stamm, John A.: *See—*
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Standard Oil Company: *See—*
Aziz, Walid Y.; Ball, Lawrence E.; and Li, George S., 4,020,128.
Standard Oil Company (Indiana): *See—*
Allen, Richard L.; Benjamin, Benny M.; Lappin, Terry A.; Ridgway, John A., Jr.; and Saunders, Elmer J., 4,019,962.
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Stanfield, Charles Keith: *See—*
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McMann, Wilbur S.; and Stang, Charles, Jr., 4,019,569.
Stanley, Philip E.: *See—*
Woods, William E.; and Stanley, Philip E., 4,020,471.
Stanton, Bernard M. Indexing system. 4,019,759, Cl. 283-42.000.
Stapp, Hans: *See—*
Herveling, Wilhelm; Birker, Alfred; Daimler, Berthold H.; Vos, Jan G.; and Stapp, Hans, 4,019,326.
Staron, Philippe: *See—*
Michon, Dominique; and Staron, Philippe, 4,020,447.
Starr, George N.; and Robertson, Boyd C., Jr., to Bridger, Floyd R., Jr. Seed planter with a suction pickup mechanism. 4,019,651, Cl. 221-211.000.
Staszkiewicz, Rudolf. Rotary support for use in a machine tool. 4,019,410, Cl. 82-2.500.
Stauble, Georg: *See—*
Wosegien, Bernd; and Stauble, Georg, 4,019,426.
Staudinger, Frederick J.; and Montagnino, James G., to Pitney-Bowes, Inc. Envelope stacking system. 4,019,730, Cl. 271-181.000.
Stauffer Chemical Company: *See—*
Gutman, Arnold D., 4,020,161.
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Appleyard, Francis J.; and Stavrinou, Stavros C., 4,020,020.
Steel Company of Canada, Limited, The: *See—*
Smith, William, 4,019,359.
Steffen, Horst, to Kollmorgen Technologies Corporation. Process for the catalytic sensitization of non-metallic surfaces for subsequent electroless metallization. 4,020,197, Cl. 427-304.000.
Stehl, Otto: *See—*
Derner, Paul; Sonntag, Hans; and Stehl, Otto, 4,019,295.
Stein, Claude: *See—*
Lahouste, Jean; Lemattre, Maurice, Muller, Jean-Claude; and Stein, Claude, 4,020,021.
Steinberg, Meyer; Colombo, Peter; and Pruzansky, Jacob, to United States of America, Energy Research and Development Administration. Fixation of tritium in a highly stable polymer form. 4,020,003, Cl. 252-301.10W.
Steinke, Leo: *See—*
Weyl, Helmut; and Steinke, Leo, 4,019,974.
Sterling, Robert E. Medical splint kit. 4,019,504, Cl. 128-88.000.
Stern, Hanns; and Lotz, Alexander, to Klockner-Humboldt-Deutz Aktiengesellschaft. Method and apparatus for the preparation of mineral mixtures on a jig controlled by compressed air. 4,019,981, Cl. 209-455.000.
Stewart, Frederick M.: *See—*
Leon, Denny; and Stewart, Frederick M., 4,019,752.
Stewart, William H., Jr.: *See—*
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Stigen, Leonard Roy: *See—*
Keen, Everett Morgan; Siciliano, Anthony John; Shah, Kiran Chhabildas; Artamonoff, Serge; and Stigen, Leonard Roy, 4,019,461.

Stinson, Leon Berthal; and Galle, Edward Milburn, to Hughes Tool Company. Drill bit utilizing lubricant thermal expansion and relief valve for pressure control. 4,019,785, Cl. 308-8.200.

Stirner, Genevieve E., executrix: *See—*
Cushman, Robert Holbrook; and Stirner, Kurt R., deceased, 4,019,670.

Stirner, Kurt R., deceased: *See—*
Cushman, Robert Holbrook; and Stirner, Kurt R., deceased, 4,019,670.

Stobb, Inc.: *See—*
Stobb, Walter John, 4,019,639.

Stobb, Walter John, to Stobb, Inc. Automatic palletizer and method for bundled stacks of sheets. 4,019,639, Cl. 214-6.00C.

Stock, David K.; and Wech, Robert J., to FMC Corporation. Multipurpose sealing and severing method and mechanism. 4,019,947, Cl. 156-510.000.

Stockel, Dieter; and Oberg, Hans-Jurgen, to G. Rau. Electrical contact element and method of producing the same. 4,019,876, Cl. 428-621.000.

Stoddard, Xerxes T.: *See—*
Terry, Ruel C.; and Stoddard, Xerxes T., 4,019,578.

Stoepel, Kurt: *See—*
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 4,020,178.

Stohr, Arno: *See—*
Birkhofer, Hans; Stohr, Arno; and Schrammel, Werner, 4,019,845.

Stoia, John Z.; and Wright, Clarence E., to Carborundum Company, The. Studded hearth. 4,019,445, Cl. 110-10.000.

Stoilov, Nikola Dimov; and Hoklar, Ivan Konstantinov, to Institute za Metalloobrabotvashti Machini. Device for clamping tools in the seat of a tool magazine. 4,019,245, Cl. 29-568.000.

Stone, Samuel M.: *See—*
Fellows, Daniel; Zemon, Stanley; Sturk, Phillip A.; and Stone, Samuel M., 4,019,806.

Storm, John F., to Honeywell Inc. AC switch speed control for two phase motors. 4,020,402, Cl. 318-227.000.

Strachan, Donald Rittler: *See—*
Ross, Roger Allen; and Strachan, Donald Rittler, 4,020,139.

Streit, Kenneth F., to Phone-Ducs, Inc. Device for connecting conduit to a manhole or the like. 4,019,760, Cl. 285-3.000.

Stresau, Richard W.: *See—*
Lorah, Lawrence D.; Stresau, Richard W.; Lapson, Lawrence B.; and van Vloten, Curtis P., 4,019,811.

Strickland, Gene: *See—*
Edwards, Dalma Therman; and Strickland, Gene, 4,019,767.

Strike, Robert, to General Dynamics, Pomona Division. Impact discriminating apparatus for missiles and the like, and method for impact discrimination. 4,019,440, Cl. 102-70.20R.

Stripinis, Philip S.: *See—*
Redinger, Ira H., Jr.; Sadowsky, David; and Stripinis, Philip S., 4,019,320.

Strom, Johan Paul, to U.S. Philips Corporation. Arrangement for selective firing of so-called IR-torches. 4,019,421, Cl. 89-1.50R.

Strubel, David G.; and Johnson, Robert R., to Brown & Williamson Tobacco Corporation. Tobacco substitute containing boric oxide, boron oxyacids, and ammonium, alkali metal, or alkaline earth metal salts of boron oxyacids. 4,019,520, Cl. 131-2.000.

Strubhar, Malcolm K.: *See—*
Fitch, John L.; and Strubhar, Malcolm K., 4,019,577.

Strubin, Harald, to BBC Brown Boveri & Company Limited. Compressed gas electrical switch with gas-tight housing. 4,020,307, Cl. 200-302.000.

Strunk, Larry E., to Tenneco Inc. Spring type pipe support. 4,019,599, Cl. 180-64.00A.

Stuckey, Ronald L.: *See—*
Kelver, William L.; Stuckey, Ronald L.; and Rozema, Arthur L., 4,020,445.

Stuhler, William B.: *See—*
Bieser, Albert H.; Stuhler, William B.; and Smith, Dorsey T., 4,020,491.

Stuhmer, Werner: *See—*
Hell, Hans; Peschke, Gunter; Oppermann, Horst; Kaufung, Rudolf; Funke, Siegfried; and Stuhmer, Werner, 4,019,958.

Stump, James M. Auxiliary two-speed transmission. 4,019,400, Cl. 74-333.000.

Sturk, Phillip A.: *See—*
Fellows, Daniel; Zemon, Stanley; Sturk, Phillip A.; and Stone, Samuel M., 4,019,806.

Suelzle, Larry R.; and Hodges, Leonard O., to Delta Electronic Control Corporation. Switching mode power controller of large dynamic range. 4,020,361, Cl. 307-106.000.

Suen, Tzeng Jiueq; Begala, Arthur James, Jr.; and Grayson, Martin, to American Cyanamid Company. Control of corrosion and scale in circulating water systems by means of partial esters of polyfunctional organic acids. 4,020,000, Cl. 252-180.000.

Sugai, Tatsuhiko: *See—*
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,020,505.

Sugiyama, Iwao; Furuhama, Teruhide; Nagano, Fumiaki; and Hirakawa, Hiroshi, to Yokohama Rubber Co., Ltd., The. Vulcanization accelerator system for rubber compositions. 4,020,252, Cl. 526-30.000.

Sugiyama, Tadashi: *See—*
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, 4,020,442.

Sugiyama, Takahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photographic wide angle lens. 4,019,810, Cl. 350-214.000.

Suh, Nam P.; Malguarnera, Salvatore C.; and Anderson, Frederick H., to Massachusetts Institute of Technology. Fluid delivery and mixing systems. 4,019,652, Cl. 222-1.000.

Sumio, Horikomi. Hand-writing type recording device for a camera. 4,020,492, Cl. 346-107.00R.

Sumioka, Atsushi: *See—*
Nagashiro, Waichi; Okabe, Tadao; Sumioka, Atsushi; and Oikawa, Mitsuru, 4,020,191.

Sumitomo Metal Industries, Ltd.: *See—*
Shiraiwa, Toshio; Kobayashi, Sumio; Marukawa, Katsukiyo; and Anezaki, Syoji, 4,019,562.

Summers, James B., to NBS Incorporated. Collapsible plant support. 4,019,280, Cl. 47-45.000.

Sundstrand Corporation: *See—*
Crull, Stanley W., 4,019,596.
Schauer, George A., 4,019,404.

Surgical Design Corporation: *See—*
Banko, Anton, 4,019,514.

Sutherland, Derek Ronald: *See—*
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Sutherland, James Kenneth: *See—*
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Sutton, Ralph W.: *See—*
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Suzuka, Susumu: *See—*
Tsunoda, Takahiro; Ozutsumi, Minoru; Maeda, Shigeo; Suzuka, Susumu; Komiya, Hidetoshi; and Shinohara, Hideaki, 4,019,907.

Suzuki, Hiroshi: *See—*
Fujiwara, Hiroshi; and Suzuki, Hiroshi, 4,020,225.

Suzuki, Hisao; Musashi, Akira; Ando, Yoshiyuki; and Inoue, Tomoyuki, to Nippon Soda Company Limited. Thermosetting resin. 4,020,125, Cl. 260-859.00R.

Suzuki, Shigemitsu: *See—*
Kaneko, Ryuichi; Yokozawa, Minori; Suzuki, Shigemitsu; and Kamegaya, Takeo, 4,020,280.

Suzuki, Takeo; and Nakanishi, Toshihide, to Kyowa Hakko Kogyo Kabushiki Kaisha. Process for producing (2'-amino-2'-deoxypentofuranosyl) guanine. 4,019,057, Cl. 195-28.00N.

Suzuki, Toshio; and Shikano, Yoshiro, to Mitsubishi Denki Kabushiki Kaisha. Vapor cooling device for dissipating heat of semiconductor elements. 4,020,399, Cl. 361-331.000.

Suzuki, Yasoji; Manabe, Kenshi; and Hirasawa, Masataka, to Tokyo Shibaura Electric Co., Ltd. Counter using an inverter and shift registers. 4,020,362, Cl. 307-225.00C.

Suzuki, Yutaka: *See—*
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.

Svenska Dataregister AB: *See—*
Englund, Gosta R.; and Lindelow, Ernst C-G, 4,019,617.

Swanson Engineering, Inc.: *See—*
Swanson, Floyd R., Jr., 4,019,438.

Swanson, Floyd R., Jr., to Swanson Engineering, Inc. Sleeving and sleeving stand apparatus and method. 4,019,438, Cl. 102-24.00R.

Sweet, Anthony William: *See—*
Kitajewski, Ryszard; Sweet, Anthony William; and Dyer, Michael Philip, 4,020,294.

Swift Chemical Company: *See—*
Kealy, Joseph P., 4,019,889.

Swiss Aluminium Ltd.: *See—*
Setzer, William C.; Cheskis, Harvey P.; and Pryor, Michael J., 4,019,931.

Sybron Corporation: *See—*
Ellis, Franklin Hammond, 4,019,510.

Symons, Philip C., to Energy Development Associates. Control of generation of chlorine feed from chlorine hydrate for use in a metal chlorine electric energy storage device. 4,020,238, Cl. 429-15.000.

Syntex (U.S.A.) Inc.: *See—*
Nelson, Peter H.; and Untch, Karl G., 4,020,094.

Szabo, Ervin I., to Canadian Patents and Development Limited. Method of forming foundry moulds. 4,019,558, Cl. 164-26.000.

Szabo, Ervin I., to Canadian patents and Development Limited. Method of forming a foundry mold. 4,019,559, Cl. 164-26.000.

Szabo, Janos. Liquid dispenser for selective upside down or right side up use. 4,019,661, Cl. 222-376.000.

Szabo, Lester J.: *See—*
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Tabler, Donald C.: *See—*
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Takahashi, Chigo: *See—*
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Takahashi, Kenzoo: *See—*
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Takahashi, Noriyoshi: *See—*
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Takamatsu, Ikuo, to Yoshida Kogyo Kabushiki Kaisha. Replaceable seat cover. 4,019,776, Cl. 297-219.000.
Takamizawa, Minoru: *See—*
Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; and Fujii, Hitoshi, 4,019,904.
Takashima, Toshiyuki: *See—*
Karasudani, Isao; Takashima, Toshiyuki; and Bokuda, Yoshiyuki, 4,020,217.
Takayama, Taro; and Kakegawa, Eiya. Inorganic gel-ammonium nitrate composite material and method of manufacturing the same. 4,019,934, Cl. 149-43.000.
Takayanagi, Kiyoshi: *See—*
Negishi, Akira; Takayanagi, Kiyoshi; Ikeda, Masaru; and Kousaka, Shinji, 4,019,899.
Takeda Chemical Industries, Ltd.: *See—*
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Takeda, Mitsuo: *See—*
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Takeshita, Hiroshi: *See—*
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Takeuchi, Akihiro: *See—*
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Takeuchi, Kazuo: *See—*
Sasaki, Kichiro; Takeuchi, Kazuo; Kazitani, Shiro; Shimizu, Kazuo; and Yoshida, Yoshiteru, 4,019,543.
Taliani, Laurent: *See—*
Perronnet, Jacques; and Taliani, Laurent, 4,020,076.
Tallonneau, Georges, to S.T. Dupont. Method for the storage of liquefied gas in the presence of a fibrous adsorbant support. 4,019,850, Cl. 431-12.000.
Tamai, Yasuo; Osawa, Sadao; and Honjo, Satoru, to Fuji Photo Film Co., Ltd. Manufacturing process for liquid developer. 4,019,993, Cl. 252-62.100.
Tamai, Yasuo: *See—*
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Tamura, Kaoru: *See—*
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Tanaka, Yoshio: *See—*
Irimajiri, Shoichiro; Tanaka, Yoshio; and Kobayashi, Atsushi, 4,020,455.
Tangeman, Lawrence N.; and Linsenmeyer, Arthur, to Dempster Industries, Inc. Apparatus for synchronizing the speed of a material spreader or the like with the speed of a vehicle upon which it is mounted. 4,019,685, Cl. 239-156.000.
Tanigami, Takahiko: *See—*
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Tanigawa, Takeshi: *See—*
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, 4,020,442.
Taniguchi, Yuzo: *See—*
Tanimoto, Michio; and Taniguchi, Yuzo, 4,019,669.
Tanimoto, Michio; and Taniguchi, Yuzo, to Hitachi, Ltd. Wire bonding apparatus. 4,019,669, Cl. 228-4.500.
Tassi, Lamberto; Ballestrazzi, Aris; and Tosarelli, Gianni, to Situno Holding S.A. Conveyance unit with crossing, especially for the conveyance and switching of newspapers, magazines and other articles composed by superposed sheets. 4,019,623, Cl. 198-457.000.
Tassi, Lamberto: *See—*
Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, 4,019,307.
Tate, Walter; and Robertson, Thomas, to Davy Powergas Limited; and Rotraco Systems Limited. Electrical control system. 4,020,359, Cl. 307-40.000.
Taylor, Charlie Edwin: *See—*
Cannon, Henry T.; and Taylor, Charlie Edwin, 4,020,401.
Taylor, Edward C.; and McKillop, Alexander. Process for O-acylating thallus salts of 2-pyridone. 4,020,073, Cl. 260-294.80R.
Taylor, John Sebring; and Brader, Wilbur Thomas, to FMC Corporation. Vinyl transfer sheet material and method for applying same to vinyl substrate. 4,020,204, Cl. 428-40.000.
Taylor Woodrow Construction Limited: *See—*
Dawson, Peter; and Barrett, Charles Jack, 4,019,749.
Technion Research and Development Foundation Ltd.: *See—*
Rom, Josef; Alterman, Israel; and Schwartz, Joseph, 4,019,331.
Tecumseh Products Company: *See—*
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Tefertiller, Nancy B.: *See—*
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Teige, Wolfgang: *See—*
Hahnke, Manfred; Papenfuhs, Theodor; and Teige, Wolfgang, 4,020,037.
Telecommunications Radioelectriques et Telephoniques T.R.T.: *See—*
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Teledyne Ryan Aeronautical a Division of Teledyne Industries, Inc.: *See—*
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Teledyne Water Pik: *See—*
Elkins, Christopher W., 4,019,502.
Teleplex, Inc.: *See—*
Anderson, Scott K., 4,020,289.
Tenczar, Francis J. Adhesively activated sterile connector. 4,019,512, Cl. 128-214.00R.
Tenneco Inc.: *See—*
Strunk, Larry E., 4,019,599.
Tennenhouse, Gerald J.: *See—*
Gordon, Ronald S.; Sutton, Ralph W.; and Tennenhouse, Gerald J., 4,020,134.
Teodorescu, Constantin, to Institutul National Pentru Creatie Stinifica si Tehnica. Gas extraction apparatus for thermal installations. 4,019,834, Cl. 417-84.000.
Terris, Barbara Zitko: *See—*
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Terry, Alvah B.: *See—*
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Terry, Ruel C.; and Stoddard, Xerxes T. Recovery of petroleum from tar and heavy oil sands. 4,019,578, Cl. 166-267.000.
Tessler, Martin M., to National Starch and Chemical Corporation. Preparation of starch esters. 4,020,272, Cl. 536-107.000.
Texaco Inc.: *See—*
Fuller, Matthew H.; and Deever, William R., 4,019,985.
Smith, Harry D., Jr.; and Schultz, Ward E., 4,020,342.
Texas Instruments Incorporated: *See—*
Black, Christopher Thurson, 4,019,248.
Cochran, Michael J.; and Hamilton, Stephen P., 4,020,465.
Oess, Frederick G.; and Peshock, Michael, Jr., 4,020,381.
Textron, Inc.: *See—*
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MacFee, Norman W., 4,019,240.
Thames Sack and Bag Company Limited, The: *See—*
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Theracon, Inc.: *See—*
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Thiel, Patrick L.: *See—*
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Thiessens, Alexander Joseph Gerardus; and Woldring, Leonard, to U.S. Philips Corporation. Inductive stabilizing ballast for a gas and/or vapor discharge lamp. 4,020,439, Cl. 336-61.000.
Thomas & Betts Corporation: *See—*
Logan, Maurus C., 4,019,241.
Thomas, Dorsey O., Jr.; and Terry, Alvah B., to Monsanto Company. Strand granulation machine. 4,019,414, Cl. 83-356.300.
Thomas, Norman W.: *See—*
Davis, Howard J.; and Thomas, Norman W., 4,020,142.
Thomasson, Charles Victor: *See—*
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Thompson, James E. Football kicking tee with vacuum ball retainer. 4,019,735, Cl. 273-55.00B.
Thompson, Lee W. Board game apparatus. 4,019,742, Cl. 273-134.0CA.
Thomson-Brandt: *See—*
Carre, Bernard; Puech, Claude; and Spitz, Erich, 4,020,278.
Thomson-CSF: *See—*
Charlot, Jean-Claude; and Falconnier, Jean-Claude, 4,020,292.
Thorne, William Duncan, to International Business Machines Corporation. Linear motion drive apparatus for a printer carriage. 4,019,616, Cl. 197-90.000.
Thuler, Oscar. Luminous marking in an indentation of an object. 4,020,203, Cl. 428-35.000.
Thuse, Erik, to FMC Corporation. Apparatus for running, setting and testing a compression-type well packoff. 4,019,579, Cl. 166-123.000.
Thyssen (Great Britain) Limited: *See—*
Kempster, Edward, 4,019,327.
Tierney, William S.; and Wright, James E., to TRW Inc. Electromagnetic impulser for dynamically loading a structure. 4,019,374, Cl. 73-71.50R.
Timm, Rolando E. Method of temporarily water-proofing parts of buildings in anticipation of floods. 4,019,304, Cl. 52-746.000.
Timmins, Harold Chester: *See—*
Shannon, Suel Grant; Timmins, Harold Chester; and Gookin, Kenneth Earl, 4,019,802.
Tippetts, Thomas B., to Garrett Corporation, The. Fluidic approach power compensator control system. 4,019,697, Cl. 244-78.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Miura, Tadashi; Nomura, Tomio; and Kubota, Kohei, 4,020,012.
Nishikawa, Eiichiroh; Itoh, Takuji; and Miura, Tadashi, 4,020,011.

Toda, Gyozo: *See—*
Miyauchi, Katsuki; Matsuyama, Iwao; and Toda, Gyozo, 4,019,915.
Tokuno, Masateru; Matsuura, Masayuki; Shinmura, Noboru; and Kaneko, Masayoshi, to Rengo Kabushiki Kaisha; and Nippon Riraiansu Kabushiki Kaisha. Web cutting control system. 4,020,406, Cl. 318-600.000.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Suzuki, Yasoji; Manabe, Kenshi; and Hirasawa, Masataka, 4,020,362.
Yasutome, Osamu; Takeda, Mitsuo; Sawamura, Tagayasu; and Shinoda, Norio, 4,020,386.
Tomikawa, Masami: *See—*
Matsumoto, Takeshi; Kaji, Hidehiko; Isogai, Osamu; and Tomikawa, Masami, 4,019,822.
Tomita, Keiji, to Kabushiki Kaisha Tomita Sangyo. Method of and high frequency welder assembly for binding a cover material onto a base material. 4,019,944 Cl. 156-380.000.
Tomita, Tamaki; and Hosokawa, Manabu, to Toyoda Koki Kabushiki Kaisha. Machine tool with automatic tool changer. 4,019,246, Cl. 29-568.000.
Tomita, Yoshifumi; Miura, Kiyoshi; and Nakai, Hiromitu, to Hitachi, Ltd. Method for forming fluorescent screen of color cathode ray tubes using filter layer. 4,019,905, Cl. 96-36.100.
Tomlinson, Roger R.: *See—*
Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., 4,019,815.
Tomy Kogyo Co., Ltd.: *See—*
Ishida, Hajime, 4,019,756.
Tong, Te-Kong. Game device and game. 4,019,738, Cl. 273-106.00R.
Toporcer, Louis H.: *See—*
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Toray Industries, Inc.: *See—*
Ogasawara, Masafumi; Akita, Masanori; Saito, Kazuhiko; Kikuchi, Yoshikazu; and Shiokawa, Mitsuhiro, 4,019,844.
Torres, Jean, to SAPAL Societe Anonyme des Plieuses Automatiques. Device for intermittently receiving and continuously delivering objects. 4,019,624, Cl. 198-459.000.
Torrington Company, The: *See—*
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Tosarelli, Gianni: *See—*
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Tassi, Lamberto; Ballestrazzi, Aris; and Tosarelli, Gianni, 4,019,623.
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Townsend, Graham: *See—*
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Townsend, Herbert E., Jr.; Horton, James B.; and Woodyatt, Louis R., to Bethlehem Steel Corporation. Ultra-high strength steel having improved resistance to environmental stress corrosion cracking. 4,019,901, Cl. 75-206.000.
Toyo Kogyo Co., Ltd.: *See—*
Shimoji, Masaharu; Satow, Haruhiko; and Yamasaki, Atsumichi, 4,019,471.
Yamamoto, Kenichi; and Kakui, Kuniaki, 4,019,469.
Toyoda Koki Kabushiki Kaisha: *See—*
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Konomi, Toshiaki; Nurita, Jyoji; and Masuda, Takeshi, 4,019,483.
Traini, Carlo: *See—*
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Trapasso, Louis E., to Celanese Corporation. Polyamine coating compositions. 4,020,123, Cl. 260-837.00R.
Traver, Frank J.: *See—*
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Trezeguet, Jean-Pierre: *See—*
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Trocki, Julian Robert, to Diamond Shamrock Corporation. Recovery of calcium pantothenate. 4,020,103, Cl. 260-534.00A.
Trouiller, Jean-Claude; and Vivet, Bernard, to Schlumberger Technology Corporation. Apparatus for use in investigating earth formations. 4,020,452, Cl. 340-17.00R.
Trowbridge, Leonard D. Mitre frame clamp. 4,019,270, Cl. 40-155.000.
TRW Inc.: *See—*
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Seo, Eddie T.; Silverman, Herbert P.; and Day, Robert J., 4,020,246.
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Tsuboi, Takashi; Tachibana, Kyozo; Tamura, Kaoru; and Imaizumi, Fujimaro, to Hitachi, Ltd. Static power converter controlling apparatus for reducing noise generated by phase shift control. 4,020,411, Cl. 321-27.00R.
Tsuchihashi, Genichi; and Ogura, Katsuyuki, to Sagami Chemical Research Center. Cyclic ketone mercaptal S-oxides. 4,020,171, Cl. 260-340.500.
Tsuchihashi, Shoji; Kawamoto, Yoji; and Inoue, Masayoshi, to Minolta Camera Kabushiki Kaisha. Method of using vitreous solid elecrolyte. 4,019,967, Cl. 204-1.00T.
Tsuchimochi, Yoshihisa: *See—*
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Tsukahara, Takeshi; Morioka, Minoru; Oguma, Yoichi; and Omori, Yoshitaka, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle fairing. 4,019,774, Cl. 296-78.100.
Tsunoda, Takahiro; Ozutsumi, Minoru; Maeda, Shigeo; Suzuka, Susumu; Komiya, Hidetoshi; and Shinohara, Hideaki, to Hodogaya Chemical Co., Ltd.; and Oji Paper Co., Ltd. Photosensitive azido color-forming element. 4,019,907, Cl. 96-75.000.
Tsuruta, Yasuo. Remote control of pneumatic tire pressure and its apparatus. 4,019,552. Cl. 152-417.000.
Tsuzuki, Yoshihiko: *See—*
Hobo, Nobuhito; Enomoto, Nizo; Suzuki, Yutaka; Kawamoto, Itsushi; Iyoda, Michio; Tsuzuki, Yoshihiko; Sekino, Kenro; and Nukata, Hironari, 4,019,478.
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Turcotte, Ronald E.; Wolff, Jay R.; Del Medico, Anthony P.; and Lee, Paul C., to G. D. Searle & Co. Gantry scanning camera. 4,020,348, Cl. 250-363.00S.
Turf Service Laboratories, Inc.: *See—*
Brehob, Alfred W.; and Wheeler, Carlos E., 4,020,417.
Turner, Lester Willis, to Raymond Lee Organization, Inc., The, a part interest. Cam lock jaws for machinist vise. 4,019,726, Cl. 269-261.000.
Tyrrell, James Robert, to Braun, Anton. Fluid mixing apparatus. 4;019,528, Cl. 137-209.000.
Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, to Canon Kabushiki Kaisha. Release type electromagnetic device. 4,020,433, Cl. 335-230.000.
Udvardi-Lakos, Janos, to Siemens Aktiengesellschaft. Inverter control system. 4,020,360, Cl. 307-66.000.
Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Camera with film cassette. 4,020,497, Cl. 354-27.000.
Underhill, Michael James, to U.S. Philips Corporation. Phase and/or frequency comparators. 4,020,422, Cl. 328-133.000.
Union Carbide Corporation: *See—*
Gemmill, Wayne Joseph, Sr.; and Cerone, Frank Ernest, Jr., 4,020,351.
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Unruh, Dale H.; and Yates, Jan B., to Caterpillar Tractor Co. Understeer vehicle steering system. 4,019,603, Cl. 180-134.000.
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Urquhart, Donald Bremner, to Coal Industry (Patents) Limited. Hydrogenation of coal. 4,019,975, Cl. 208-10.000.
Urushima, Mitsuo: *See*—
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van den Ouweland, Godefridus Antonius Maria; and Peer, Hendricus Gerardus, to Lever Brothers Company. Certain lower alkyl 4,5-dihydrothiophene-3-thiols. 4,020,170, Cl. 260-329.00S.
Vander Heyden, Eric Ernest, to AMP Incorporated. Filtered connector assembly with composite ground plane. 4,020,430, Cl. 333-79.000.
VanDerMeulen, Douglas J.: *See*—
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Vanderspurt, Thomas H., to Celanese Corporation. Vapor phase catalytic process for preparing alpha, beta-ethylenically unsaturated alcohols. 4,020,116, Cl. 260-638.00B.
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Vilkomerson, David Herman Raphael, to RCA Corporation. Interferometric technique for determining ultrasonic wave intensity. 4,019,818, Cl. 356-106.00R.
Vinatieri, James E., to Phillips Petroleum Company. Sample fraction collector. 4,019,545, Cl. 141-130.000.
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Vogel, Christian; and Aebi, Rudolph, to Ciba-Geigy Corporation. Plant growth regulating agent. 4,019,894, Cl. 71-118.000.
Vogt, Alfred; and Bolter, Herbert, to Interliz Anstalt. Thermostatically controlled heating arrangement including a heat pump. 4,019,679, Cl. 237-2.00B.
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Vogt, Herwart C.; Parekh, Manher; and Patton, John T., Jr., to BASF Wyandotte Corporation. Tin titanium complexes as esterification/-transesterification catalysts. 4,020,010, Cl. 252-431.00C.

von Hazmburg, Romulis S., to United States Gypsum Company. Paper covered gypsum board and process of manufacture. 4,020,237, Cl. 428-535.000.

Voplex Corporation: *See—*
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Vork, William D.; and Clements, William, to Graco Inc. Piston drive assembly. 4,019,395, Cl. 74-49.000.

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Vroom, Clifford G., to Eastman Kodak Company. Apparatus for controlling drive to pressure rollers in a camera with electric motor drive. 4,020,499, Cl. 354-86.000.

Vugrek, Andrija, to Western Electric Company, Inc. Cable block. 4,019,715, Cl. 254-134.30R.

Vuotto, Edward Joseph, to American Telephone and Telegraph Company. Rotary dial restriction circuit. 4,020,295, Cl. 179-90.00D.

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Wagner, Kelly B. Brake apparatus for use in rappelling. 4,019,609, Cl. 188-65.400.

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Wahls, Peter: *See—*
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Waite, Eric L. Shovel game. 4,019,739, Cl. 273-95.00D.

Walden, John, to Intermountain Research and Development Corporation. Producing sodium carbonate monohydrate from carbonate solution including addition of aluminum ions. 4,019,872, Cl. 23-300.000.

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Wall Industries, Inc.: *See—*
Hood, Henry Alexander, 4,019,940.

Wallace, William K., to Chicago Pneumatic Tool Company. Pulse motor nut runner. 4,019,589, Cl. 173-12.000.

Wallace, Wm. Dean: *See—*
Clark, Justin S.; and Wallace, Wm. Dean, 4,019,523.

Walraevens, Rene; and Collin, Andre, to Solvay & Cie. Halogenated polyether-polyols and polyurethane foams manufactured from the latter. 4,020,024, Cl. 260-2.5AP.

Walser, Joseph G., Jr.; and Ferrell, John O. Panty stocking and combination panty hose garment. 4,019,208, Cl. 2-240.000.

Walters, Helen: *See—*
Elmer, Thomas H.; and Walters, Helen, 4,019,884.

Walther, Jurgen: *See—*
Winter, Hermann; Lautsch, Alfred; Schonberg, Karl-Heinz; and Walther, Jurgen, 4,020,263.

Walton, Richard S.: *See—*
Mason, Daniel W.; and Walton, Richard S., 4,019,313.

Wandel u. Goltermann: *See—*
Harzer, Peter; and Funk, Hans, 4,020,392.

Wandel u. Goltermann KG: *See—*
Hoffmann, Gunther; and Harzer, Peter, 4,020,425.

Wang, Robert: *See—*
Bolz, Gunner; Deindoerfer, Fred H.; Hu, Chun P.; Kameda, Naomi; and Wang, Robert, 4,020,151.

Warburton, Keith Arthur: *See—*
Ball, John Anthony; Warburton, Keith Arthur; and Carew, Raymond Donald, 4,019,740.

Warncke, Ernst: *See—*
Oetjen, Georg-Wilhelm; and Warncke, Ernst, 4,019,507.

Warner & Swasey Company, The: *See—*
Mrugala, Theodore A., 4,019,283.

Warren, William H. Vacuum egg lifting and penetrating means. 4,019,430, Cl. 99-485.000.

Warrick, Ford E., to Akzona Incorporated. Method of combining synthetic yarns. 4,019,312, Cl. 57-157.00S.

Wartelle, Claude; and Leveque, Michel, to Centre Technique des Industries Mecaniques. Pneumatic roughness measurer. 4,019,379, Cl. 73-105.000.

Wartman, Lloyd H., to Blodgett, Norman S. Method of forming an orthopedic cast. 4,019,505, Cl. 128-90.000.

Warwick Electronics Inc.: *See—*
Carlson, Alden J., 4,019,417.

Warzec, Cezary: *See—*
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Watanabe, Itaru: *See—*
Araki, Mutsuro; Sakai, Bunshiro; Watanabe, Itaru; Yamada, Makoto; Tsukada, Koshiro; Godai, Tomokazu; Aida, Isao; and Nakagaki, Masatoshi, 4,020,312.

Watanabe, Kazuo: *See—*
Saito, Tomo; Watanabe, Kazuo; Nishiyama, Yumiko; and Morikawa, Naotake, 4,019,864.

Watanabe, Masatoshi: *See—*
Yamamoto, Hiroe; Takahashi, Noriyoshi; and Watanabe, Masatoshi, 4,020,373.

Watanabe, Masayasu, to Hokushin Electric Works, Ltd. Noise compensation in electromagnetic flowmeter. 4,019,385, Cl. 73-194.0EM.

Watanabe, Satoshi: *See—*
Uchidoi, Masanori; Miyakawa, Hideaki; Taguchi, Tetsuya; Mashimo, Yukio; and Watanabe, Satoshi, 4,020,433.

Waterman, Donald Herbert, to Valley Engineering, Inc. Apparatus for compacting snow for skiing. 4,019,268, Cl. 37-10.000.

Waters, E. Craig: *See—*
Clements, Thomas W.; and Waters, E. Craig, 4,019,534.

Watson, Francis M., III: *See—*
Claflin, Warren E.; and Watson, Francis M., III, 4,019,366.

Waugh, Dale L., to Dayco Corporation. Endless power transmission belt. 4,019,399, Cl. 74-231.00C.

Wean United, Inc.: *See—*
Greenberger, Joseph Irwin, 4,019,846.

Weaver, Gerald Q.; and Olson, Bradford A., to Norton Company. Process for fabricating silicon carbide articles. 4,019,913, Cl. 106-44.000.

Weaver, William W.: *See—*
Holman, Harry A.; Kailmeyer, Albert W.; Paulsen, Henry C.; and Weaver, William W., 4,019,540.

Webb, William, Jr., to Unitec, Inc. Combustion product indicator. 4,020,415, Cl. 324-33.000.

Webb, William David, Sr., to Du Pont de Nemours, E. I., and Company. Safety locking mechanism. 4,019,763, Cl. 292-207.000.

Wech, Robert J.: *See—*
Stock, David K.; and Wech, Robert J., 4,019,947.

Wehinger, Egbert: *See—*
Bossert, Friedrich; Wehinger, Egbert; Vater, Wulf; and Stoepel, Kurt, 4,020,178.

Weigel, Carlyle A.: *See—*
Look, Thomas F.; Podvin, Richard T.; and Weigel, Carlyle A., 4,019,945.

Weil-McLain Co., Inc.: *See—*
Deters, Elmer M., 4,019,836.

Weiland, George N., Sr., to Imoco-Gateway Corporation. Pipe hanger. 4,019,706, Cl. 248-62.000.

Weiler, Ray C. Quick release window guard. 4,019,281, Cl. 49-56.000.

Weiler, Raywood C. Wheel and tire carrier for attachment to motor vehicle doors. 4,019,664, Cl. 224-42.240.

Weins, Engelbert: *See—*
Gruner, Hans; Diederich, Gerd; Butz, Hans; Wahls, Peter; and Weins, Engelbert, 4,019,560.

Weir, Basil, to Intersil Incorporated. Integrated field-effect transistor switch. 4,020,365, Cl. 307-251.000.

Weisz, Robert O., to Essex International, Inc. Dynamoelectric machine coil. 4,020,375, Cl. 310-208.000.

Welding Institute, The: *See—*
Sanderson, Allan, 4,020,318.

Wells, William R., to United Audio Visual Corporation. Programmer expander for a plurality of devices. 4,020,464, Cl. 340-147.00P.

Welter, Leonard M.: *See—*
Coates, Vincent J.; and Welter, Leonard M., 4,020,387.

Wendling, Irmtrud: *See—*
Meyer, Juergen; and Wendling, Irmtrud, 4,020,474.

Weninger, Frank L.; Bagby, John P.; Hapke, Kenyon A.; Hinshaw, Jack W.; Karalus, George C.; Koppensteiner, Eugene F.; and Tomlinson, Roger R., to Polaroid Corporation. Film handling apparatus blower system. 4,019,815, Cl. 353-61.000.

Wesemeier, Reinhard, to International Harvester Company. V-Belt pulley with automatic tensioning device. 4,019,398, Cl. 74-230.17C.

Wessling, Diether, to Bayer Aktiengesellschaft. Conditioning of perhalogeno-copper phthalocyanines. 4,020,088, Cl. 260-314.500.

Western Electric Company, Inc.: *See—*
Bassett, Henry C.; From, Charles A., Jr.; Parker, John F.; and Worley, Ansel A., 4,019,250.
Berglowe, Sven Raymond, Jr.; and Sauer, Earl Salvator, 4,020,213.
Maddox, Harry L., 4,019,364.
Vugrek, Andrija, 4,019,715.

Westinghouse Electric Corporation: *See—*
Binstock, Morton H., 4,019,467.
Caputo, William R.; and Pisatowski, Albert J., 4,019,606.
Cherry, Sidney J., 4,020,304.
Fasulkey, Robert H.; and Quidort, Vaughn L., 4,020,397.
Gambale, John C.; and Ray, Roger E., 4,020,396.

Gass, William R.; Scala, Luciano C.; and Phillips, David C., 4,019,877.
Harlan, Larry R.; and Thiel, Patrick L., 4,019,572.
Hawkes, George F., Jr.; and Speck, Willis A., 4,020,400.
Irvin, Charles F., 4,019,249.
Knudsen, Irving E., 4,020,146.
Kulkarni, Avinash D.; and Newton, Ralph E., 4,020,380.
Mandel, Alan F.; and Vercellotti, Leonard C., 4,019,607.
Martin, Harry F., 4,019,712.
Morehead, Chalmers, 4,020,378.
Shoupp, William E.; and Bratkowski, Walter V., 4,020,369.
Silver, Paul W.; Fuselier, Richard A.; and Moore, William B., III, 4,020,468.
Smith, James D. B.; and Kauffman, Robert N., 4,020,017.
Smith, Millard F.; Behringer, Frederick J.; Doyle, John R.; and McFadden, Daniel P., 4,019,390.
Yannone, Robert A.; and Shields, James J., 4,019,315.

Wetherbee, Edward P., to Raymond Lee Organization, Inc., The, a part interest. Emergency auto ignition kit and spark plug tester. 4,020,413, Cl. 324-15.000.

Wetzler, Josef; Gaschler, August; and Hofmann, Heinz, to Planatolwerk Willy Hesselmann. Apparatus for applying hot-melt glue to edge of sheet stack. 4,019,457, Cl. 118-35.000.

Weyl, Helmut; and Steinke, Leo, to Robert Bosch G.m.b.H. Electrochemical sensor construction. 4,019,974, Cl. 204-195.00S.

Wharam, John L., to Minnesota Mining and Manufacturing Company. Tape cartridge with movable guide member. 4,019,695, Cl. 242-199.000.

Wheeler, Carlos E.: *See—*
Brehob, Alfred W.; and Wheeler, Carlos E., 4,020,417.

White, Dwain M., to General Electric Company. Polyacetylene tetrapolymers. 4,020,265, Cl. 526-285.000.

White, Jack M.: *See—*
Hall, George R., II; White, Jack M.; and Krechmery, Roger L., 4,019,388.

White, John R., to Goodyear Tire & Rubber Company, The. Diol curative for polyurethane. 4,020,001, Cl. 252-182.000.

Whiteley, Eric, to Canadian General Electric Company Limited. Cooling of discoidal dynamoelectric machines. 4,020,372, Cl. 310-61.000.

Whitson, Bobbie L.; and Morgan, John A., to Phillips Petroleum Company. Use of equalization chamber in discontinuous venting of vessel. 4,019,524, Cl. 137-14.000.

Whittaker Corporation: *See—*
Harbert, Earl W., 4,019,456.

Whittum, Howard A.; and Hjelm, Michael J., to Advance Coatings Company. Fire-resistant resin. 4,019,922, Cl. 106-271.000.

Wich, Horst W. Key cutting machine. 4,019,415, Cl. 83-413.000.

Wiedemer, Karl: *See—*
Frohling, Josef; and Wiedemer, Karl, 4,019,358.

Wiegand, Walter J., Jr.; Bullis, Robert H.; and Mongeon, Robert J., to United Technologies Corporation. Four-collector flux sensor. 4,019,383, Cl. 73-194.00F.

Wiegard, Klaus, to Daimler-Benz Aktiengesellschaft. Bearing support of the heat-exchanger disk of a regenerative heat-exchanger. 4,019,750, Cl. 267-160.000.

Wiese, Hans Holger. Bucket conveyor. 4,019,625, Cl. 198-708.000.

Wiles, Michael F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,020,472.

Wilke, Richard; and Korthaus, Helmut. System for controlling motor speed. 4,020,404, Cl. 318-318.000.

Wilkerson, Alan W., to Allen-Bradley Company. Telephonic trouble-shooting circuit for electric motor drives. 4,020,287, Cl. 179-2.00A.

Wilkinson Sword Limited: *See—*
Rowsell, David G.; and Spring, David J., 4,020,153.

Will Ross, Inc.: *See—*
Clements, Thomas W.; and Waters, E. Craig, 4,019,534.
Newman, John W.; and Schoonover, Frank D., 4,019,207.
Quinn, David G.; and Rauschenberger, Richard A., 4,019,707.

Willenborg, Robert A., to Raymond Lee Organization, Inc., The, a part interest. Trash compactor apparatus. 4,019,219, Cl. 15-339.000.

Williams, Albert G.: *See—*
Soehngen, John W.; and Williams, Albert G., 4,020,145.

Williams, Thurston V. Wood splitting apparatus. 4,019,549, Cl. 144-193.00A.

Wills, Milton Herman, Jr., to Martin Marietta Corporation. Portland cement compositions. 4,019,918, Cl. 106-90.000.

Windisch, Anthony Jude. Light signalling device for bicycles and switch therefor. 4,020,458, Cl. 340-67.000.

Windmoller & Holscher: *See—*
Zimmermann, Werner Josef, 4,019,843.

Winter, Arthur J., to Fairchild Camera and Instrument Corporation. Analog-to-digital converter employing common mode rejection circuit. 4,020,487, Cl. 340-347.0NT.

Winter, Carl E., deceased; and by Cohen, Julia Winter, legal representative. Variable speed positive gear transmission. 4,019,405, Cl. 74-691.000.

Winter, Hermann; Lautsch, Alfred; Schonberg, Karl-Heinz; and Walther, Jurgen, to Chemische Werke Huls Aktiengesellschaft. Process for the production of emulsion polyvinyl chloride under avoidance of vinyl chloride emissions. 4,020,263, Cl. 526-88.000.

Winter, Hermann: *See—*
Kalka, Josef; Winter, Hermann; and Beckmann, Jurgen, 4,020,032.

Wintersdorff, Robert W.; and Cota, George R., to Teledyne Ryan Aeronautical a Division of Teledyne Industries, Inc. Aircraft of low observability. 4,019,699, Cl. 244-121.000.

Wirotama, I. Poetoe Gde: *See—*
Ney, Karl Heinz; Wirotama, I. Poetoe Gde; and Freytag, Wolfram Gustav, 4,020,190.

Wise, Thomas Q., to Belden Corporation. Strand package and carton therefor. 4,019,636, Cl. 206-396.000.

Wismer, Marco; and Parker, Earl E., to PPG Industries, Inc. Method of forming a non-glossy film. 4,020,193, Cl. 427-54.000.

Wismer, Marco: *See—*
Schimmel, Karl F.; and Wismer, Marco, 4,020,050.

Wisotsky, Max J., to Exxon Research and Engineering Company. Additive combination for cold flow improvement of middle distillate fuel oil. 4,019,878, Cl. 44-62.000.

Witte, Josef; and Lehnert, Gunther, to Bayer Aktiengesellschaft. Catalysts. 4,020,257, Cl. 526-143.000.

Wittenberger, John C.: *See—*
Peterson, Dean M.; and Wittenberger, John C., 4,020,496.

Witzel, William L. Football game board. 4,019,737, Cl. 273-94.00R.

Wixson, Donald F.; and Ostrander, George K., to Air Preheater Company, Inc., The. Lens holder. 4,019,567, Cl. 165-5.000.

Woerner, Hans, to Mineral Research & Development Corporation. Noncorrosive cuprammonia fungicide and method for using same. 4,020,180, Cl. 424-294.000.

Wohrl, Alfons: *See—*
Spies, Johann; and Wohrl, Alfons, 4,020,453.

Woldring, Leonard: *See—*
Thiessens, Alexander Joseph Gerardus; and Woldring, Leonard, 4,020,439.

Wolfe, Otho C.: *See—*
Kibler, Ralph J.; and Wolfe, Otho C., 4,019,273.

Wolff, Jay R.: *See—*
Turcotte, Ronald E.; Wolff, Jay R.; Del Medico, Anthony P.; and Lee, Paul C., 4,020,348.

Wolff, Martin Jay: *See—*
Levy, Emanuel Edward; and Wolff, Martin Jay, 4,019,260.

Wolgemuth, Larry G., to Atlantic Richfield Company. Additives for increasing the density of urethane foams prepared from ADNC. 4,020,023, Cl. 260-2.50A.

Wolski, Raymond A.: *See—*
Morgen, Melvin; Herman, Richard; and Wolski, Raymond A., 4,019,441.

Woo, Lecon, to Du Pont de Nemours, E. I., and Company. Thermomechanical analyzer. 4,019,365, Cl. 73-15.600.

Wooding, William M.: *See—*
Soldati, Gianluigi; Eilberg, Ralph G.; Melger, Helga; and Wooding, William M., 4,020,019.

Woods, Kenneth K.: *See—*
Herzog, Josef; Woods, Kenneth K.; and Hubble, William S., 4,019,881.

Woods, William E.; and Stanley, Philip E., to Honeywell Information Systems, Inc. Interrupt scan and processing system for a data processing system. 4,020,471, Cl. 340-172.500.

Woodstream Corporation: *See—*
Landell, Harper; and Michel, John M., 4,019,274.

Woodyatt, Louis R.: *See—*
Townsend, Herbert E., Jr.; Horton, James B.; and Woodyatt, Louis R., 4,019,901.

Worley, Ansel A.: *See—*
Bassett, Henry C.; From, Charles A., Jr.; Parker, John F.; and Worley, Ansel A., 4,019,250.

Wosegien, Bernd; and Stauble, Georg, to Knorr-Bremse GmbH. Hand brake for a brake cylinder. 4,019,426, Cl. 92-113.000.

Wright, Clarence E.: *See—*
Stoia, John Z.; and Wright, Clarence E., 4,019,445.

Wright, Edward S.; Angstadt, John W.; and Garrow, Gerald L., to Blaw-Knox Food and Chemical Equipment, Inc. Process for deep-fat cooking. 4,020,189, Cl. 426-438.000.

Wright, James E.: *See—*
Tierney, William S.; and Wright, James E., 4,019,374.

Wright, Peter John, to Ilford Limited. Silver halide photographic material. 4,019,908, Cl. 96-114.000.

Wright Tool & Forge Co., The: *See—*
Greenlee, Hugh T., 4,019,632.

Wroclawski, Zbigniew; Kedzia, Stanislaw; and Pawlowski, Tadeusz, to Centralny Osrodek Badawxzorozwojowy Maszyn Wlokienniczych "Centamatex". Method and apparatus for winding yarn onto a cross-and-cone wound bobbin. 4,019,691, Cl. 242-45.000.

Wust, Olivier: *See—*
Gujer Peter; and Wust, Olivier, 4,019,690.

Wyland, Alvin D., to General Electric Company. Device system and method for controlling the supply of power to an electrical load. 4,020,358, Cl. 307-39.000.

Wysor, Michael S., to Ebert, Michael; and Kalil, Eugene J., part interest to each. Administration of silver sulfadiazine and radioactive derivatives thereof. 4,020,150, Cl. 424-1.000.

Xerox Corporation: *See—*
Bernhard, John S., 4,019,816.
Crystal, Richard G., 4,019,437.
Forgensi, Rudolph; and Hagenbach, Robert J., 4,019,842.
Geer, Loren E., 4,020,210.
Hagenbach, Robert J.; and Fenity, Robert D., deceased, 4,019,903.
Leder, Lewis B.; Schottmiller, John C.; and Schroeder, Harold H., 4,019,902.
Nishikawa, A. Hirotoshi; and Hixson, Harry F., Jr., 4,020,268.

Yamada, Makoto: *See*—
Araki, Mutsuro; Sakai, Bunshiro; Watanabe, Itaru; Yamada, Makoto; Tsukada, Koshiro; Godai, Tomokazu; Aida, Isao; and Nakagaki, Masatoshi, 4,020,312.

Yamamoto, Hiroe; Takahashi, Noriyoshi; and Watanabe, Masatoshi, to Hitachi, Ltd. Rotary electric machine. 4,020,373, Cl. 310-61.000.

Yamamoto, Kenichi; and Kakui, Kuniaki, to Toyo Kogyo Co., Ltd. Intake means for rotary piston engines. 4,019,469, Cl. 123-8.130.

Yamamoto, Yasushi: *See*—
Noshiro, Atsumi; Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; and Fujii, Hitoshi, 4,019,904.

Yamamoto, Yuichiro: *See*—
Ito, Hiroshi; Sugiyama, Tadashi; Kaminaka, Yoshinori; Yamamoto, Yuichiro; Tanigawa, Takeshi; Shoji, Shunichi; and Saito, Yoshifusa, 4,020,442.

Yamasaki, Atsumichi: *See*—
Shimoji, Masaharu; Satow, Haruhiko; and Yamasaki, Atsumichi, 4,019,471.

Yamashiro, Osamu; and Shimada, Shunji, to Hitachi, Ltd. Constant-current circuit. 4,020,367, Cl. 307-297.000.

Yamashita, Hisao: *See*—
Yamauchi, Akira; Kakuma, Tetsu; Yamashita, Hisao; and Ariga, Masahiko, 4,019,226.

Yamauchi, Akira; Kakuma, Tetsu; Yamashita, Hisao; and Ariga, Masahiko, to Jex Co., Ltd. Apparatus for automatically shaping cellulose type menstrual tampons. 4,019,226, Cl. 19-144.500.

Yannone, Robert A.; and Shields, James J., to Westinghouse Electric Corporation. Gas turbine power plant control apparatus including a temperature reset starting control system and an ignition pressure control system. 4,019,315, Cl. 60-39.030.

Yarris, William T., to Towmotor Corporation. Shielded side thrust roller assembly for lift truck mast units. 4,019,786, Cl. 308-6.00R.

Yarway Corporation: *See*—
Brand, Warren H., 4,019,527.

Yasutome, Osamu; Takeda, Mitsuo; Sawamura, Tagayasu; and Shinoda, Norio, to Tokyo Shibaura Electric Co., Ltd. Flat type display tube. 4,020,386, Cl. 313-496.000.

Yates, Jan B.: *See*—
Unruh, Dale H.; and Yates, Jan B., 4,019,603.

Yeager, Kenneth A.: *See*—
Schaft, Edwin E.; and Yeager, Kenneth A., 4,020,316.

Yokohama Rubber Co., Ltd., The: *See*—
Sugiyama, Iwao; Furuhama, Teruhide; Nagano, Fumiaki; and Hirakawa, Hiroshi, 4,020,252.

Yokoi, Hideharu: *See*—
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, 4,019,982.

Yokoyama, Shoichiro: *See*—
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Yokoi, Hideharu; and Murakami, Tatsuo, 4,019,982.

Yokozawa, Minori: *See*—
Kaneko, Ryuichi; Yokozawa, Minori; Suzuki, Shigemitsu; and Kamegaya, Takeo, 4,020,280.

Yoshida, Hiroshi, to Aikoh Co., Ltd. Desulfurizing and inoculating agent for molten iron. 4,019,897, Cl. 75-58.000.

Yoshida Kogyo Kabushiki Kaisha: *See*—
Ebata, Hiroyuki, 4,019,227.
Sado, Yukio, 4,019,429.
Takamatsu, Ikuo, 4,019,776.

Yoshida, Kunio: *See*—
Hayami, Heijiro; Kotera, Hiroaki; Tsuchiya, Hiroyoshi; Kan, Ryuzo; Yoshida, Kunio; Shibata, Tsutomu; and Tsuda, Yukifumi, 4,020,502.

Yoshida, Takashi: *See*—
Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, 4,019,319.

Yoshida, Yoshinari: *See*—
Iida, Masajiro; Morimatsu, Hideharu; Fukuoka, Itsuo; and Yoshida, Yoshinari, 4,020,446.

Yoshida, Yoshiteru: *See*—
Sasaki, Kichiro; Takeuchi, Kazuo; Kazitani, Shiro; Shimizu, Kazuo; and Yoshida, Yoshiteru, 4,019,543.

Yoshikawa, Haruzo; Shimano, Keiji; and Oishi, Noritoshi, to Kabushiki Kaisha Daini Seikosha. Tuning device. 4,019,419, Cl. 84-454.000.

Yoshikawa, Kensuke: *See*—
Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, 4,019,319.

Yoshioka, Kouichi: *See*—
Hiraga, Kentaro; Okutani, Tetsuya; Asako, Tsunehiko; and Yoshioka, Kouichi, 4,020,269.

Young, Donald C.: *See*—
Fleck, Raymond N.; and Young, Donald C., 4,020,109.

Yuan, Edward Lung, to Du Pont de Nemours, E. I., and Company. Coated fabrics and laminated articles therefrom. 4,020,209, Cl. 428-257.000.

Yuasa, Shiro: *See*—
Kondo, Takeo; Hyodo, Yoichi; Ono, Hiroyuki; and Yuasa, Shiro, 4,019,403.

Zahner, Hansruedi; and Muller, Gerd. High voltage switching device with calcium-aluminum glass filled resin insulator support. 4,020,306, Cl. 200-293.000.

Zamfirescu, Napoleon Leon, to Northrop Corporation. Torquing system for stabilizing inertial platforms. 4,019,392, Cl. 74-5.00R.

Zaro, Giosue. Method and apparatus for the sizing of tubular bodies of a thermoplastic material which are continuously extruded. 4,020,136, Cl. 264-89.000.

Zavadsky, Georgy Vladimirovich: *See*—
Akunov, Viktor Ivanovich; Blinov, Ivan Timofeevich; Boryakov, Viktor Fedorovich; Ermolaev, Nikolai Evgenievich; Zavadsky, Georgy Vladimirovich; Lopatin, Vladimir Viktorovich; and Rusakov, Gennady Fedorovich, 4,019,688.

Zearfoss, Elmer W., Jr. Refrigeration apparatus and method. 4,019,337, Cl. 62-113.000.

Zeh, Peter H.: *See*—
Mohr, Richard A.; Bhalla, Sushil K.; and Zeh, Peter H., 4,020,148.

Zehner, Peter: *See*—
Schuster, Hans H.; and Zehner, Peter, 4,019,719.

Zeitler, Gerhard; and Mueller-Tamm, Heinz, to BASF Aktiengesellschaft. Extrudable foamable composition comprising an olefin polymer, a styrene polymer and a hydrogenated styrene butadiene block copolymer. 4,020,025, Cl. 260-2.5HB.

Zemon, Stanley: *See*—
Fellows, Daniel; Zemon, Stanley; Sturk, Phillip A.; and Stone, Samuel M., 4,019,806.

Zenith Radio Corporation: *See*—
Dougherty, Lawrence W., 4,019,231.
Palac, Kazimir; and Stachniak, Raymond M., 4,020,493.

Ziegler, Lloyd L., to Extracorporeal Medical specialities Inc. Dialyzer membrane seal and tubing connector. 4,019,988, Cl. 210-494.00R.

Zielinski, Eugene J., to Owens-Illinois, Inc. Flexible electrical circuit connections. 4,019,798, Cl. 339-17.00F.

Zielinski, Jerzy: *See*—
Golebiowski, Andrzej; Paluch, Stanislawa; Janecki, Zdzislaw; Polanski, Alfred; Hennel, Waclaw; Zielinski, Jerzy; Warzec, Cezary; and Lisowski, Wojciech, 4,019,969.

Zimmermann, Werner Josef, to Windmoller & Holscher. Film blow-head for producing tubular film. 4,019,843, Cl. 425-72.00R.

Zook, Donald G.; Miller, Kenneth J.; and Patton, Eugene K., to Caterpillar Tractor Co. Vacuum pressure fill of viscous dampers. 4,019,242, Cl. 29-434.000.

Zoppi, Bruno, to Fabbrica Italiana Magneti Marelli, S.p.A. Device for shutting off damaged sections in pneumatic multi-section braking systems for vehicles. 4,019,526, Cl. 137-110.000.

Zuber, Guenter: *See*—
Keller, Guenter; Klinger, Friedrich; Pohl, Andreas; Schimanski, Gerhard; and Zuber, Guenter, 4,019,378.

Zuhn, Arthur A., to Caterpillar Tractor Co. Controller for turbocharger system for internal combustion engines. 4,019,323, Cl. 60-606.000.

Zweigle, Maurice L.; and Kasley, Samuel J., to Dow Chemical Company, The. Method for preparing polymers from water soluble vinyl monomers. 4,020,256, Cl. 526-88.000.

LIST OF REISSUE PATENTEES

TO WHOM

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Anderson, Raymond F.; Mackes, Ronald C.; Andrews, Richard Edwin; and Mawe, Patrick Maurice, to BQP Industries, Inc. Slip pallet. Re. 29,192, Cl. 108-51.300.

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Carlyle, Lance John, to Economics Laboratory, Inc. Fluid metering device. Re. 29,193, Cl. 137-99.000.

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Winn, Martin, to Abbott Laboratories. Alkylphenyl benzopyranopyridines. Re. 29,196, Cl. 424-256.000.

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Kordes, Reimer, to Jackson & Perkins Co. Rose plant. 4,044, 4-26-77, Cl. 24.000.

Ulery, Dale W., to Ulery Greenhouse Company. Dieffenbachia named Uleryii. 4,045, 4-26-77, Cl. 88.000.

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Warriner, William A., to Jackson & Perkins Co. Rose plant. 4,043, 4-26-77, Cl. 20.000.

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Bacon, Warren F. Bar stool. 244,108, 4-26-77, Cl. D6-32.000.

Barks, Robert L. Portable shower. 244,135, 4-26-77, Cl. D23-57.000.

Benson, James A.: *See*—
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Bliven, Robert P. Telephone. 244,141, 4-26-77, Cl. D14-53.000.

Bliven, Robert P. Telephone. 244,142, 4-26-77, Cl. D26-14.00A.

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Buckner, Carrol E., to Smoky Mountain Enterprises. Stove. 244,136, 4-26-77, Cl. D23-107.000.

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Dick, Larry G. Retaining tool for a cut can lid. 244,118, 4-26-77, Cl. D7-105.000.

Dilyard, Richard D., to Rubbermaid Incorporated. Plant stand. 244,115, 4-26-77, Cl. D6-182.000.

England, Will Clarke. Condensed multiple convergence linear optical plate for intensification of solar radiation or the like. 244,139, 4-26-77, Cl. D13-4.000.

England, Will Clarke. Condensed multiple convergence reflective linear optical and receiver plate for solar conversion or the like. 244,143, 4-26-77, Cl. D26-1.00R.

Forrer, Hans; and Wegmuller, Max, to K. Zysset & Co. AG. Egg-cutter. 244,119, 4-26-77, Cl. D7-106.000.

Friedman, Ira, to Rowe Furniture Corporation. Commode or similar article. 244,111, 4-26-77, Cl. D6-167.000.

Friedman, Ira, to Rowe Furniture Corporation. Cocktail table. 244,112, 4-26-77, Cl. D6-175.000.

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Jackson, Allen W. Fishing lure. 244,132, 4-26-77, Cl. D22-27.000.

Jones, Paul W., to Physio-Control Corporation. Defibrillator paddle electrode. 244,153, 4-26-77, Cl. D83-1.00F.

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Kolowski, Michael A.; and Roberts, Charles W., to Goodyear Tire & Rubber Company, The. Tire. 244,129, 4-26-77, Cl. D12-143.000.

Kvittingen, Johs. Abduction splint. 244,152, 4-26-77, Cl. D24-64.000.

Ladjimi, Wannas Alfred. Earring suspendable necklet. 244,126, 4-26-77, Cl. D11-8.000.

Lalonde, Michael G. Ice cube tray. 244,131, 4-26-77, Cl. D15-90.000.

Latanzi, Lewis A., to Contact Systems, Inc. Electronic component production assembly locater. 244,110, 4-26-77, Cl. D6-85.000.

London, Jeff. Child's rocking chair. 244,106, 4-26-77, Cl. D6-11.000.

Macari, Laurence Anthony, to Macari's Limited. Modular sound system for musical instruments with electric pickups. 244,144, 4-26-77, Cl. D14-96.000.
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Naylor, Thomas H. Display stand. 244,117, 4-26-77, Cl. D6-188.000.
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Shiffman, Jerome. Jewelry ring box. 244,122, 4-26-77, Cl. D9-235.000.
Shiffman, Jerome. Watch box. 244,123, 4-26-77, Cl. D9-235.000.
Smith, David B.; Benson, James A.; and Jones, Paul W., to Physio-Control Corporation. Portable defibrillator. 244,154, 4-26-77, Cl. D83-1.00F.
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Van Den Haak, Johannes, to Curtis Dyna Products Corporation. Battery checker. 244,125, 4-26-77, Cl. D10-77.000.
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Zola, Colman. Bar stool. 244,107, 4-26-77, Cl. D6-32.000.
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64 4,019,935
71 4,019,936
73.1 4,019,937
78 4,019,938
80 4,019,939
148 4,019,940
179 4,019,941
180 4,019,942
227 4,019,943
380 4,019,944
405 4,019,945
497 4,019,946
510 4,019,947
519 4,019,948
582 4,019,949
623 R 4,019,950

CLASS 157

1.1 4,019,553

CLASS 159

4 CC 4,019,951

CLASS 160

84 R 4,019,554
238 4,019,556
354 4,019,557
371 4,019,555

CLASS 162

29 4,019,952
272 4,019,953

CLASS 164

26 4,019,558
4,019,559
89 4,019,560
155 4,019,561
4,019,562
4,019,563
271 4,019,564
283 M 4,019,565

CLASS 165

2 4,019,566
5 4,019,567
8 4,019,568
26 4,019,569
67 4,019,570
105 4,019,571
106 4,019,572
175 4,019,573

CLASS 166

.5 4,019,574
61 4,019,575
123 4,019,579
250 4,019,576
259 4,019,577
267 4,019,578
315 4,019,580

CLASS 169

16 4,019,581
37 4,019,582
62 4,019,583
74 4,019,584

CLASS 172

4.5 4,019,585
802 4,019,587
804 4,019,588

CLASS 173

12 4,019,589

CLASS 174

15 S 4,020,274
4,020,275
23 R 4,020,276
146 4,020,277

CLASS 175

57 4,019,590
107 4,019,591
234 4,019,592
340 4,019,593

CLASS 176

38 4,019,954
4,019,955

CLASS 178

18 4,020,281
68 4,020,282
88 4,020,283

CLASS 179

1 E 4,020,284
1.5 A 4,020,286
1.5 R 4,020,285
2 A 4,020,287
15 AT 4,020,290
15 FD 4,020,288
4,020,289
15.55 R 4,020,292
15.55 T 4,020,291
18 FA 4,020,294
18 GF 4,020,293
90 D 4,020,295
115.5 PV 4,020,296
156 A 4,020,297
175 4,020,298
181 R 4,020,299

CLASS 180

6.48 4,019,596
11 4,019,597
33 A 4,019,594
33 R 4,019,595
51 4,019,598
64 A 4,019,599
70 R 4,019,600
90 4,019,601
101 4,019,602
134 4,019,603

CLASS 182

2 4,019,604

CLASS 186

1 R 4,019,605

CLASS 187

29 R 4,019,606
4,019,607

CLASS 188

59 4,019,608
65.4 4,019,609
73.3 4,019,610
4,019,611
196 BA 4,019,612
218 XL 4,019,613

CLASS 191

22 R 4,020,300

CLASS 192

48.91 4,019,586
103 F 4,019,614

CLASS 195

6 4,019,956
28 N 4,019,957
62 4,019,958
66 R 4,019,959
80 R 4,019,960
103.5 R 4,019,961
142 4,019,962

CLASS 197

53 4,019,615
90 4,019,616
133 R 4,019,617
161 4,019,618
189 4,019,619

CLASS 198

399 4,019,620

432 4,019,621
441 4,019,622
457 4,019,623
459 4,019,624
708 4,019,625
750 4,019,626
786 4,019,627

CLASS 200

50 AA 4,020,301
61.45 R 4,020,302
144 B 4,020,304
159 R 4,020,305
293 4,020,306
302 4,020,307
310 4,020,308
314 4,020,309

CLASS 202

263 4,019,963

CLASS 203

1 4,019,964
60 4,019,965

CLASS 204

1 T 4,019,966
4,019,967
23 4,019,968
26 4,019,969
32 R 4,019,970
130 4,019,971
159.15 4,019,972
194 4,019,973
195 S 4,019,974

CLASS 206

219 4,019,630
315 B 4,019,629
347 4,019,631
349 4,019,632
364 4,019,633
386 4,019,634
4,019,635
396 4,019,636
418 4,019,637
524.4 4,019,628

CLASS 208

10 4,019,975
57 4,019,976
188 4,019,977
213 4,019,978
353 4,019,979

CLASS 209

211 4,019,980
455 4,019,981

CLASS 210

30 R 4,019,982
62 4,019,983
66 4,019,984
80 4,019,985
139 4,019,986
232 4,019,987
494 R 4,019,988

CLASS 211

74 4,019,638

CLASS 214

6 C 4,019,639
6 H 4,019,640
14 4,019,641
77 R 4,019,642
505 4,019,643
506 4,019,644

CLASS 215

1 R 4,019,645
329 4,019,646

CLASS 219

10.49 4,020,310
10.55 A 4,020,311
61 4,020,312
69 E 4,020,313
73 R 4,020,314
91 4,020,315
103 4,020,316
121 EB 4,020,318
121 EM 4,020,317
121 LM 4,020,319
137 PS 4,020,320
271 4,020,321
392 4,020,322
405 4,020,323

CLASS 220

3.3 4,019,647
88 B 4,019,649
273 4,019,648

CLASS 221

116 4,019,650
211 4,019,651

CLASS 222

1 4,019,652
4,019,653
4,019,654
96 4,019,655
103 4,019,656
136 4,019,657
144.5 4,019,658
193 4,019,659
304 4,019,660
376 4,019,661
414 4,019,662
529 4,019,663

CLASS 224

42.24 4,019,664

CLASS 226

112 4,019,665
171 4,019,667

CLASS 227

119 4,019,666

CLASS 228

3.1 4,019,668
4.5 4,019,669
45 4,019,670
123 4,019,671

CLASS 229

14 C 4,019,672
17 R 4,019,673
23 R 4,019,674
31 R 4,019,675

CLASS 234

115 4,019,676

CLASS 235

61.11 E 4,020,327
61.5 S 4,020,324
61.7 B 4,020,325
4,020,326
146 4,020,328
151.11 4,020,331
151.3 4,020,329
4,020,330
152 4,020,332
156 4,020,333
164 4,020,334

CLASS 236

9 A' 4,019,677
12 A 4,019,678

CLASS 237

2 B 4,019,679
9 R 4,019,680
63 4,019,681

CLASS 239

77 4,019,682
102 4,019,683
145 4,019,684
156 4,019,685
205 4,019,686
573 4,019,687

CLASS 240

7.1 R 4,020,335
9.5 4,020,336
10 A 4,020,337
46.53 4,020,338
46.59 4,020,047

CLASS 241

39 4,019,688
282.1 4,019,689

CLASS 242

18 A 4,019,690
45 4,019,691
71.8 4,019,692
84.2 B 4,019,693
131.1 4,019,700
152.1 4,019,701
182 4,019,694
199 4,019,695

CLASS 244

42 CD 4,019,696
78 4,019,697
110 A 4,019,698
121 4,019,699
182 4,019,702

CLASS 248

4 4,019,703
16 4,019,704
58 4,019,705
62 4,019,706
95 4,019,707
137 4,019,708
150 4,019,709
181 4,019,710

CLASS 249

59 4,019,711

CLASS 250

202 4,020,339
203 R 4,020,340
211 J 4,020,341
270 4,020,342
311 4,020,343
330 4,020,344
343 4,020,345
358 R 4,020,346
361 R 4,020,347
363 S 4,020,348
377 4,020,349
396 ML 4,019,989
423 P 4,020,350
432 PD 4,020,351
436 4,020,352
441 4,020,353
492 B 4,020,354
506 4,020,355
510 4,020,356
568 4,020,357

CLASS 251

26 4,019,712
28 4,019,713
138 4,019,714

CLASS 252

8.9 4,019,990
48.2 4,019,991
62.1 4,019,993
62.52 4,019,994
62.53 4,019,995
63.7 4,019,996
68 4,019,992
78.3 4,019,997
135 4,019,998
140 4,019,999
180 4,020,000
182 4,020,001
299 4,020,002
301.1 W 4,020,003
4,020,004
316 4,020,005
408 4,020,006
429 B 4,020,007
4,020,008
429 R 4,020,009
431 C 4,020,010
441 4,020,011
4,020,012
466 PT 4,020,013
511 4,020,014
544 4,020,015
546 4,020,016

CLASS 254

134.3 R 4,019,715
139 4,019,716
187.5 4,019,718
187.8 4,019,717

CLASS 259

4 AB 4,019,719
4 AC 4,019,721
4 R 4,019,720
105 4,019,722
183 4,019,723

CLASS 260

2 A 4,020,018
2 EC 4,020,017
2 EN 4,020,019
2.3 4,020,020
2.5 A 4,020,023
2.5 AP 4,020,024
2.5 H 4,020,021
2.5 HB 4,020,022
4,020,025
3 4,020,026
17.2 4,020,027
18 EP 4,020,028
23.7 M 4,020,054
24 4,020,029
29.2 EP 4,020,030
29.2 R 4,020,031
29.6 R 4,020,032
31.8 Z 4,020,033
32.8 EP 4,020,034
38 4,020,035
40 R 4,020,036
42.21 4,020,037
42.33 4,020,038
42.37 4,020,039
42.56 4,020,040
45.8 NZ 4,020,041
45.85 H 4,020,042
46.5 G 4,020,043
46.5 UA 4,020,044
47 XA 4,020,045
51.5 4,020,048
75 M 4,020,049
78 TF 4,020,050
78 UA 4,020,303

140 R 4,020,051
4,020,052
205 4,020,053
239.3 D 4,020,055
240 D 4,020,056
243 B 4,020,059
243 C 4,020,057
4,020,058
4,020,060
243 R 4,020,061
244 A 4,020,062
247.5 E 4,020,064
247.5 H 4,020,063
248 NS Re.29,195
4,020,065
249.6 4,020,066
4,020,067
250 Q 4,020,068
251 R 4,020,070
256.4 R 4,020,071
293.58 4,020,074
293.6 4,020,072
294.8 R 4,020,073
296 B 4,020,075
302 E 4,020,076
306.7 C 4,020,077
306.8 D 4,020,078
307 A 4,020,079
307 D 4,020,081
307 G 4,020,080
307 R 4,020,082
308 A 4,020,084
308 R 4,020,083
309 4,020,085
309.5 4,020,086
309.7 4,020,087
314.5 4,020,088
326 R 4,020,089
327 P 4,020,168
328 4,020,169
329 S 4,020,170
340.5 4,020,171
343.2 R 4,020,172
343.6 4,020,173
346.8 A 4,020,174
347.2 4,020,175
349 4,020,176
399 4,020,177
429.7 4,020,090
4,020,091
4,020,092
455 A 4,020,093
469 4,020,094
470 4,020,095
471 C 4,020,096
473 A 4,020,097
473 S 4,020,098
475 PN 4,020,099
501.13 4,020,100
502.4 R 4,020,101
520 A 4,020,102
520 E 4,020,069
534 A 4,020,103
563 B 4,020,104
566 A 4,020,105
4,020,106
580 4,020,107
586 P 4,020,108
601 R 4,020,109
606.5 P 4,020,110
611 A 4,020,111
612 R 4,020,112
619 A 4,020,113
632 A 4,020,115
638 B 4,020,116
652 P 4,020,117
666 B 4,020,118
677 A 4,020,119
680 D 4,020,120
681.5 R 4,020,114
683.15 D 4,020,121
835 4,020,122
837 R 4,020,123
859 R 4,020,125
873 4,020,126
876 R 4,020,124
878 R 4,020,127
879 4,020,128
900 4,020,046
983 4,020,129

CLASS 261

111 4,020,130

CLASS 264

.5 4,020,131
34 4,020,132
53 4,020,133
63 4,020,134
78 4,020,135
89 4,020,136
90 4,020,137
130 4,020,138
171 4,020,139
261 4,020,140

289 4,020,141
347 4,020,142

CLASS 266

156 4,019,724
169 4,019,725

CLASS 267

160 4,019,750

CLASS 269

261 4,019,726
328 4,019,727

CLASS 270

58 4,019,728

CLASS 271

18.3 4,019,729
181 4,019,730
183 4,019,731
245 4,019,732
4,019,733

CLASS 272

137 4,019,734

CLASS 273

55 B 4,019,735
73 R 4,019,736
94 R 4,019,737
95 D 4,019,739
106 R 4,019,738
131 BA 4,019,741
131 KN 4,019,740
134 CA 4,019,742
135 B 4,019,744
135 D 4,019,743
136 A 4,019,745
137 AB 4,019,746
137 AE 4,019,747
176 AB 4,019,748

CLASS 277

58 4,019,749

CLASS 280

31 4,019,751
179 R 4,019,752
214 4,019,230
415 A 4,019,753
456 R 4,019,754
490 A 4,019,755
649 4,019,756
4,019,757

CLASS 281

21 R 4,019,758

CLASS 283

42 4,019,759

CLASS 285

3 4,019,760
47 4,019,761
340 4,019,762

CLASS 292

207 4,019,763
288 4,019,764
338 4,019,765
350 4,019,766

CLASS 294

5.5 4,019,767
19 R 4,019,768
4,019,769
78 R 4,019,770
83 R 4,019,771

CLASS 296

20 4,019,772
21 4,019,773
78.1 4,019,774
155 4,019,775

CLASS 297

219 4,019,776
284 4,019,777
346 4,019,778
411 4,019,779

CLASS 298

11 4,019,780
22 J 4,019,781

CLASS 301

58 4,019,782

CLASS 302

25 4,019,783

CLASS 307

39 4,020,358
40 4,020,359
66 4,020,360
106 4,020,361
225 C 4,020,362
229 4,020,363
242 4,020,364
251 4,020,365
271 4,020,366
297 4,020,367

CLASS 308

6 R 4,019,784
4,019,786
8.2 4,019,785
73 4,019,787
187.1 4,019,788
190 4,019,789
201 4,019,790
217 4,019,791
219 4,019,792

CLASS 310

4 R 4,020,368
15 4,020,369
37 4,020,370
52 4,020,371
61 4,020,372
4,020,373
80 4,020,374
208 4,020,375

CLASS 312

209 4,019,793
311 4,019,794

CLASS 313

103 CM 4,020,376
112 4,020,377
174 4,020,378
220 4,020,379
222 4,020,380
302 4,020,381
318 4,020,382
344 4,020,383
359 4,020,384
489 4,020,385
496 4,020,386

CLASS 315

31 R 4,020,387
58 4,020,388
246 4,020,389
371 4,020,390
377 4,020,391
386 4,020,392

CLASS 316

1 4,019,795

CLASS 318

227 4,020,402
257 4,020,403
318 4,020,404
432 4,020,405
600 4,020,406
632 4,020,407

CLASS 321

2 4,020,408
10 4,020,409
11 4,020,410
27 R 4,020,411

CLASS 323

43.5 R 4,020,412

CLASS 324

15 4,020,413
29.5 4,020,414
33 4,020,415
64 4,020,416
65 R 4,020,417
78 D 4,020,418

CLASS 325

421 4,020,419
464 4,020,420
478 4,020,421

CLASS 328

133 4,020,422
151 4,020,423
167 4,020,424

CLASS 331

16 4,020,425
158 4,020,426

CLASS 333

22 R 4,020,427
73 R 4,020,429
73 S 4,020,428
79 4,020,430
98 TN 4,020,431

CLASS 335

76 4,020,432
230 4,020,433
4,020,434
275 4,020,435
286 4,020,436
299 4,020,437

CLASS 336

5 4,020,438
61 4,020,439
155 4,020,440

CLASS 337

187 4,020,441
299 4,020,442

CLASS 338

28 4,020,443
202 4,020,444
312 4,020,445

CLASS 339

12 R 4,019,796
14 P 4,019,797
17 F 4,019,798
59 R 4,019,799
97 R 4,019,800
98 4,019,801
177 R 4,019,802
275 B 4,019,803

CLASS 340

5 R 4,020,446
7 R 4,020,447
8 S 4,020,448
15 4,020,449
15.5 DS 4,020,451
15.5 GC 4,020,450
17 R 4,020,452
52 B 4,020,454
52 H 4,020,453
53 4,020,455
58 4,020,456
66 4,020,457
67 4,020,458
146.1 AB 4,020,460
146.1 AG 4,020,459
146.1 AL 4,020,461
146.3 AE 4,020,462
4,020,463
147 P 4,020,464
172.5 4,020,465
4,020,466
4,020,467
4,020,468
4,020,469
4,020,470
4,020,471
4,020,472
4,020,473
173 SP 4,020,474
174 TF 4,020,476
174 YC 4,020,475
224 4,020,477
235 4,020,478
237 R 4,020,480
237 S 4,020,479
244 E 4,020,481
279 4,020,482
324 AD 4,020,483
347 DA 4,020,484
4,020,485
4,020,486
347 NT 4,020,487
412 4,020,488

CLASS 343

6.5 LC 4,020,489
8 4,020,490
765 4,020,491

CLASS 346

107 R 4,020,492

CLASS 350

7 4,019,804
96 C 4,019,805
4,019,806
160 LC 4,019,807
4,019,808
160 R 4,019,809
214 4,019,810
274 4,019,811
304 4,019,812

CLASS 351

14 4,019,813

CLASS 352

169 4,019,814

CLASS 353

61 4,019,815

CLASS 354

1 4,020,493
4,020,494
5 4,020,495
25 4,020,496
27 4,020,497
86 4,020,498
4,020,499

CLASS 355

3 P 4,019,816
43 Re.29,194
132 4,019,817

CLASS 356

73 4,019,819
106 R 4,019,818
205 4,019,820

CLASS 358

19 4,020,500
64 4,020,501
80 4,020,502
128 4,020,278
160 4,020,279
242 4,020,280

CLASS 360

1 4,020,503
17 4,020,504
101 4,020,505
137 4,020,506

CLASS 361

24 4,020,397
45 4,020,394
59 4,020,395
60 4,020,398
64 4,020,396
227 4,020,393
331 4,020,399
353 4,020,400
433 4,020,401

CLASS 401

4 4,019,821
96 4,019,822

CLASS 402

75 4,019,823

CLASS 403

261 4,019,824

CLASS 404

133 4,019,825

CLASS 408

1 R 4,019,826
202 4,019,827

CLASS 415

72 4,019,830
122 R 4,019,828
143 4,019,829

CLASS 416

97 R 4,019,831
135 4,019,832
220 R 4,019,833

CLASS 417

84 4,019,834
253 4,019,835
360 4,019,836
386 4,019,837
393 4,019,838
517 4,019,839

CLASS 418

241 4,019,840
257 4,019,841

CLASS 423

32 4,020,143
226 4,020,144
261 4,020,146
329 4,020,147
415 P 4,020,148
447.4 4,020,145
575 4,020,149

CLASS 424

1 4,020,150
1.5 4,020,151
4 4,020,152
49 4,020,153
4,020,154
70 4,020,155
76 4,020,156
177 4,020,157
4,020,158
180 4,020,159
4,020,160
211 4,020,161
227 4,020,162
248.55 4,020,163
256 Re.29,196
266 4,020,178
267 4,020,164
270 4,020,165
273 4,020,166
4,020,167
274 4,020,179
294 4,020,180
305 4,020,181
327 4,020,182
341 4,020,183

CLASS 425

7 4,019,842
72 R 4,019,843
131.5 4,019,844
146 4,019,845
194 4,019,846
421 4,019,847
443 4,019,848
445 4,019,849

CLASS 426

19 4,020,184
36 4,020,185
4,020,186
72 4,020,187
95 4,020,188
438 4,020,189
534 4,020,190

CLASS 427

12 4,020,191
19 4,020,192
54 4,020,193
172 4,020,194
193 4,020,195
248 G 4,020,196
304 4,020,197
334 4,020,199
336 4,020,198
416 4,020,200

CLASS 428

8 4,020,201
33 4,020,202
35 4,020,203
40 4,020,204
116 4,020,205
137 4,020,206
138 4,020,207
166 4,020,221
209 4,020,222
217 4,019,873
224 4,020,223
251 4,020,225
255 4,020,208
257 4,020,209
272 4,020,224
276 4,020,262
290 4,020,226
306 4,020,227
307 4,020,210
323 4,020,211
325 4,020,261
347 4,020,228
361 4,020,212
372 4,020,229
379 4,020,213
389 4,020,214
398 4,020,230
403 4,020,231
411 4,020,232
419 4,020,233
420 4,020,215
425 4,020,216
429 4,020,217
433 4,020,234
443 4,020,235
447 4,020,218
457 4,020,236
460 4,020,219
472 4,020,220
535 4,020,237
570 4,019,875
621 4,019,876
626 4,019,877

CLASS 429

15 4,020,238
42 4,020,239
50 4,020,240
54 4,020,241
66 4,020,242
93 4,020,243
100 4,020,244
4,020,245
104 4,020,246
119 4,020,247
164 4,020,248

CLASS 431

2 4,019,851
5 4,019,852
12 4,019,850
67 4,019,853
80 4,019,854
256 4,019,855
298 4,019,856

CLASS 526

3 4,020,249
13 4,020,250
20 4,020,251
30 4,020,252
88 4,020,256
4,020,263
89 4,020,253
128 4,020,254
153 4,020,255
142 4,020,264
143 4,020,257
178 4,020,258
194 4,020,259
237 4,020,260
285 4,020,265

CLASS 528

498 4,020,266
503 4,020,267

CLASS 536

1 4,020,268
10 4,020,269
18 4,020,270
88 4,020,271
107 4,020,272

CLASSIFICATION OF DESIGNS

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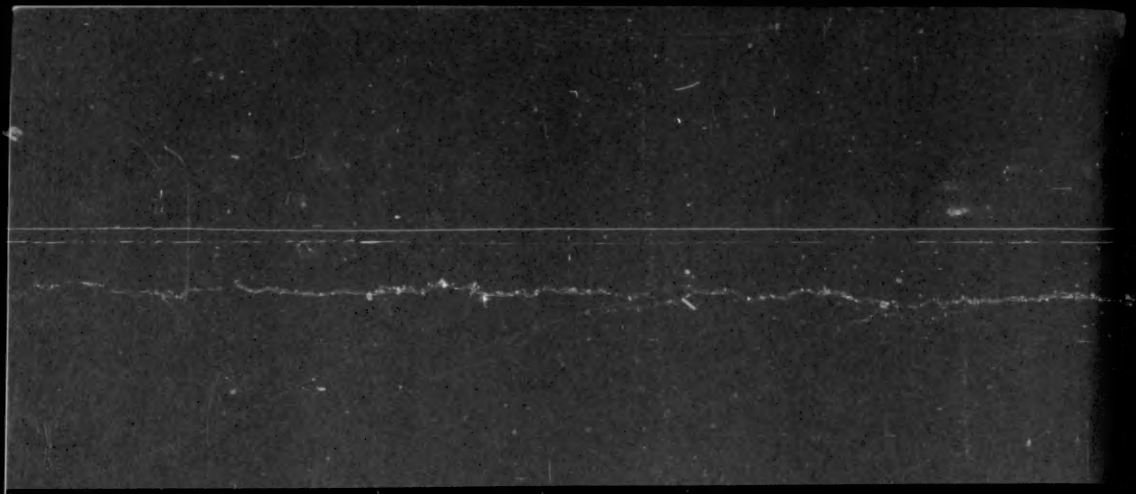

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, *Secretary*

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*